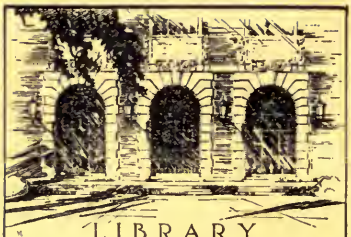

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FLORA OF PERU

BY

J. FRANCIS MACBRIDE

CURATOR, PERUVIAN BOTANY

BOTANICAL SERIES
FIELD MUSEUM OF NATURAL HISTORY
VOLUME XIII, PART IIIA, NUMBER 1
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FLORA OF PERU

J. Francis Macbride

EUPHORBIACEAE. Spurge Family

Herbs, shrubs or trees, sometimes vines, rarely in Peru fleshy or simulating in form some cactus, often more or less lactescent. Leaves simple, entire or dentate but lobed only in a few genera, sometimes deeply and even tri-foliate. Flowers monoecious or dioecious, ordinarily small and apetalous or also asepalous, sometimes enclosed in a calyx-like involucre. Stamens 1–many. Ovary superior, 3(1–4)-celled with 1 or 2 pendulous ovules in each cell. Styles or stigmas as many or twice as many as ovary cells. Capsules commonly 3-lobed, 3-valved. Embryo straight, the flat cotyledons almost as wide as the fleshy oily endosperm.

The genus *Hevea* in this large family is the most important source of natural rubber, *Manihot* of the starch cassava (tapioca), *Ricinus* of castor oil, all plants known in Peru either native or in cultivation. The Asian *Aleurites Fordii* and other species yielding tung oil, could, as in other warm regions, become valuable cultivated trees. Notable as the family is in an economic way it is scarcely less exploited in horticulture, an outstanding example in Peru being the widely grown and sometimes adventive foliage ornamental "Croton," its leaves usually variously mottled with yellow and red; it is *Codiaeum variegatum* (L.) Blume from Malay and the islands of the Pacific and is quite distinct from the genus *Croton* so common in Peru. As yet less familiar in Peru is the "Pascua" of Mexico (*Euphorbia pulcherrima* Willd.), cultivated in northern countries as Christmas Flower or Poinsettia, named after Poinsett, a minister to Mexico from the United States who promoted the plant in horticulture about 1828.

This compilation is taken by and large from Pax & Hoffmann's revision in Pflanzenreich as cited for each genus; I acknowledge my indebtedness to their careful treatment. However, it is my impression that they have not succeeded in advancing the taxonomy of the group but have accepted and proposed far too many monotypic or small genera, apparently on the basis of tradition or logic, and without the comparative consideration of their general relationships that probably would result in their inclusion within better-

defined groups at most as sections. Even some generic groupings seem less satisfactory than those of Mueller; one example is their emphasis on the presence of a rudimentary ovary, a character of course often developed in degree and not "holding," according to descriptions. As elsewhere in this work the terms "male" and "female," for convenience and to avoid repetition, have been associated not alone with the word "flower."

The key is based largely on the male flowers, more generally present in herbaria.

Flowers (male and female) surrounded by a calyx-like involucre; perianth none or minute.

Involucre regular, calyx-like or cupulate.....1. *Euphorbia.*

Involucre irregular, oblique, appendaged.....2. *Pedilanthus.*

Flowers not involucrate or rarely and then the involucre, unless in *Pera,* containing only one sex; perianth usually present.

Ovules geminate; petals if present usually scale-like; flowers commonly fasciculate or solitary in the leaf-axils (spicate or racemose in *Richeria,* paniculate in *Hyeronima*).

Fruit capsular; pubescence not lepidote. (Also see genera mentioned under *Drypetes.*)

Petals none; plants often ligneous, at least in Peru eglandular.

Petioles short or wanting; herbs, shrubs, rarely trees.

Flowers solitary or in open clusters; herbs or shrubs. 3. *Phyllanthus.*

Flowers in axillary glomerules; trees.....4. *Securinega.*

Petioles elongate; trees.....5. *Richeria.*

Petals 5; herb or half shrub, in Peru glandular..6. *Andrachne.*

Fruit drupaceous; petals none; pubescence often lepidote.

Flowers paniculate; pubescence lepidote; petioles long. 7. *Hyeronima.*

Flowers fasciculate; pubescence not lepidote; petioles short. 8. *Drypetes.*

Ovules 1 in each cell; flowers not fascicled or solitary (bracteately involucrate in *Dalechampia* and *Pera*), inflorescences sometimes conoid or short and glomerulate.

Stamens inflexed in bud; indument either stellate or lepidote, usually conspicuous; rudimentary ovary none...9. *Croton.*

Stamens straight in bud, sometimes sessile, anther tips directed upward or (and) rudimentary ovary obvious.

Segments of male calyx valvate in bud, rarely wanting (in Peru, *Pera*); male disk or receptacle often present (as noted); petals developed only in first three genera (male flowers unknown in *Conceveibastrum*).

Petals of male flowers well developed.

Ovary rudiment none or obsolete; disk glandular; trichomes in part malpighiaceous.

Petals entire.....10. *Argythamnia.*

Petals parted.....11. *Chiropetalum.*

Ovary rudiment obvious; disk none; trichomes simple. 12. *Caperonia.*

Petals wanting in flowers of both sexes.

Inflorescence partly involucrate by small, calyciform or even foliaceous bracts; disk none.

Inflorescence bisexual; bracts geminate, often large. 13. *Dalechampia.*

Inflorescence unisexual; bracts calyciform...14. *Pera.*

Inflorescence not bracteately involucrate.

Leaves divided or deeply lobed.

Leaves trifoliate; disk glandular.....15. *Hevea.*

Leaves deeply lobed; disk none.....16. *Ricinus.*

Leaves entire or not lobed.

Plants twining, scandent or if erect pubescence in part stinging, unless *Megalostylis.*

Capsules 4-celled, except *Megalostylis;* ligneous plants without stinging trichomes; stamen receptacle more or less developed.

Stamens free or mixed with glands; leaves palmately 3-nerved from base.

Female flowers at base of male racemes; stamens free.....17. *Plukenetia.*

Female flowers in axillary racemes; filaments mixed with glands.....18. *Elaeophora.*

Stamens united into a columnar or globular receptacle; leaves pinnately nerved or 5-nerved from base.

Receptacle globose, the sessile anthers many; leaves pinnate-nerved . . . 19. *Apodandra.*

Receptacle columnar, the anthers 6; leaves basally 5-nerved . . . . . 20. *Megalostylis.*

Capsules 3-celled; plants sometimes half-shrubs but usually with stinging trichomes; disk none or glandular . . . . . 21. *Tragia.*

Plants not twining or scandent.

Anther cells elongate and narrow, often flexuose; flowers usually in slender spikes or racemes, the male, especially, dense . . . . 22. *Acalypha.*

Anther cells globose or oblong; flower clusters more or less remote or spikes short; disk or receptacle present.

Male flowers panicled, sometimes narrowly (unknown in *Conceveibastrum;* genera doubtful).

Styles slender, usually long and soon conspicuous; stamens 8 or fewer. 23. *Alchornea.*

Styles rather stout, short, papillose.

Leaves cordate; stamens (known) 3–5.

Leaves glandular; female sepals 4–6. 24. *Aparisthmium.*

Leaves eglandular; female sepals 10–12. 25. *Conceveibastrum.*

Leaves oblong-elliptic; stamens 16. 26. *Conceveiba.*

Male flowers racemose or spicate, the inflorescence elongate (Peru).

Disk thick, sometimes 1 or 4–6 stamens central . . . . . 27. *Caryodendron.*

Disk none or glandular, the stamens then 4–22, free.

Disk none; styles wanting or elongate.

Stamens 2–3; stigmas sessile or nearly. 28. *Adenophaedra.*

Stamens many; styles elongate, bifid. 29. *Cleidion.*

Disk usually glandular; styles short.
30. *Bernardia.*

Segments of male calyx imbricate or open in bud or before anthesis, or subunited and cupulate, often reduced or wanting; disk none unless in first five genera; petals none except *Jatropha, Pausandra, Pogonophora.*

Flowers in dichotomous cymes or congested cymules; leaves usually lobed.

Leaves usually lobed; cymes dichotomous.

Petals present; pubescence innocuous....31. *Jatropha.*

Petals lacking; pubescence stinging...32. *Cnidoscolus.*

Leaves entire; cymules congested.....33. *Cunuria.*

Flowers variously disposed, not dichotomously cymose, nor in congested cymules.

Leaves deeply lobed, at least some, or linear.
34. *Manihot.*

Leaves neither lobed nor linear.

Petals present.

Leaves dentate; flowers in spicately arranged glomerules.....35. *Pausandra.*

Leaves entire.

Flowers in short axillary panicles.
36. *Pogonophora.*

Flowers in elongate panicles in upper axils.
37. *Dodecastigma.*

Petals lacking.

Petioles biglandular at or toward the tip.

Erect; glands small; foliose bracts lacking; fruit capsular.

Spikes commonly terminal; approximate leaf nerves glabrous.

Pericarp base persisting as a 3-radiate receptacle; petioles short.44. *Stillingia.*

Pericarp base not as above; petioles (Peru) mostly or all 1.5–3 cm. long.
45. *Sapium.*

Racemes or panicles axillary; remote leaf nerves early pubescent.
38. *Tetrorchidium.*

Scandent; glands 2 mm. long; bracts in part foliose; fruit fleshy.....39. *Omphalea.*

Petioles eglandular (leaf blades sometimes glandular at or above base).

Male flowers in racemes or panicles, these sometimes narrow or panicled spikes.

Petioles of subelliptic leaves apically tumidulous, slender; stamens usually 5–12; styles nearly free.

Male flowers panicled; sepals 4; ovary 2-celled.....40. *Nealchornea.*

Male flowers in panicled spikes; sepals 3–5; ovary usually 3-celled.41. *Senefeldera.*

Petioles of oblongish leaves not tumid at apex; stamens 10–70 or 2–3; styles connate. 42. *Mabea.*

Male flowers in very slender or often multibracted, rather ovoid, simple spikes.

Leaves small, serrulate; spikes slender, terminal, opposite leaves or on leafy branchlets.

Pericarp not persisting; male calyx usually 3-lobed or -parted....43. *Sebastiania.*

Pericarp persisting, 2–3-radiate; male calyx shortly bilobed.....44. *Stillingia.*

Leaves entire or ample; spikes subovoid or short and axillary.

Spikes axillary.....46. *Actinostemon.*

Spikes terminal.

Leaves not cordate.....47. *Maprounea.*

Leaves cordate.....48. *Hura.*

1. EUPHORBIA L.

Reference: Boissier in DeCandolle Prodr. 15, pt. 2: 1–187. 1862.

Variable vegetatively as commonly interpreted, but drawn to include plants with milky sap, simple leaves, and several male flowers enclosed with one centrally disposed female in a calyx-like, cup-shaped, sometimes oblique involucre called a cyathium, this with

some narrow bracts within, 4–5 lobes and often as many glands without and alternate with the lobes, the glands frequently with a white or colored appendage. Male flowers early deciduous from articulate pedicels, 1 stamen (the anther cells ordinarily globose), and usually without a calyx, this sometimes present in the female flower, minute, 3-lobed. Ovary sessile on pedicel tip, 3-celled, 3-ovuled, the 3 styles free or partly connate, often bifid. Capsules 3 bivalved cocci finally separating from the persisting axis and opening ventrally. Seeds often ecarunculate.

Louis Cutter Wheeler's careful and detailed revision of the subgenus *Chamaesyce* in Canada and the United States, Rhodora 43: 1941, has been freely drawn upon as regards the few species extending to Peru; I record my indebtedness with appreciation. The page references after these species, indicated by W followed by a number, refer to his work; others of this subgenus, indicated by B followed by a number, refer to that of Boissier. Croizat, Journ. Arnold Arb. 24: 182–184. 1943, summed up his arguments for the recognition of *Chamaesyce* S. Gray emend. Croizat as a distinct genus. Casual as is my knowledge of the family it seems to me that there is no clarification possible from any viewpoint by disturbing the status quo in the taxonomy of this group and its allies and that the constructive work in its taxonomy remains to be done within the other tribes.

Involved nomenclature and characters, the relative significance of the latter apparently often still undetermined, combine to make this group a fascinating challenge to the student, a boresome annoyance to the compiler. However, supported by Wheeler's feeling that even the subgenus *Chamaesyce* is difficult of demarcation I have arranged the following key on the basis of expediency, but most of the species that grossly resemble one another are brought into contrast.

Poinsettia or Flor de Pascua (*E. pulcherrima* Willd., native of Mexico) and Corona de Cristo, "Crown of Thorns" (*E. Milii* Des Moulins, the earliest name for *E. splendens* Boj.; cf. Croizat, Journ. Arnold Arb. 21: 506. 1940) are the well-known cultivated examples of this large group.

The general interest in the genus lies further in the fact that many herbaceous species may harbor the organisms that cause tropical leg-ulcers; Wheeler cites Mesnil, Ann. Sci. Nat. sér. 10. 3: xlii–lvii. 1921, for an interesting résumé of the voluminous literature relating to flagellates in *Euphorbia* and other lactiferous plants.

Plants cactus-like, more or less succulent or at least thorny.

Leaves rudimentary; bractsnot showy.....*E. Weberbaueri.*

Leaves developed; bracts showy, red.....*E. Milii.*

Plants tall shrubs or small trees with crowded oblanceolate-obovate leaves much longer than broad, exstipulate.

Leaves abruptly caudate; bractlets partly adnate. .*E. Tessmannii.*

Leaves mucronate or short-acuminate; bractlets deciduous or apparently distinct.

Cymes monocephalous; petioles to 5 mm. long.*E. apurimacensis.*

Cymes polycephalous; petioles to 2 cm. long.....*E. laurifolia.*

Plants never cactus-like, rarely shrubs, the leaves then neither crowded nor much longer than broad.

Involucres with 1–4 cornute or cupulate glands, sessile or crowded and terminal; annuals, the leaves mostly alternate.

Leaves acute or acuminate; glands cupulate, usually 1. *E. heterophylla.*

Leaves rounded-obtuse; glands 4, cornute.....*E. Peplus.*

Involucre glands usually 4–5, not cornute or cupulate, sometimes fimbriate or petaloid appendaged.

Petioles of mature leaves, and usually even the upper at least about a third as long as the blades.

Involucre teeth as appendages notably setaceous or ciliate-fimbriate; stipules setaceous.....*E. adiantoides.*

Involucre teeth rather broadly fimbriate, the petaloid appendages entire or crenate-dentate; stipules glanduliform or subulate.

Shrubs, trees or at least clearly suffrutescent below.

Leaves rounded at base, mostly 3–8 cm. long; petioles elongate.....*E. cotinoides.*

Leaves usually acute at base, mostly or all 1–2 cm. long; petioles to 1 cm. long.....*E. viridis.*

Annuals or scarcely more enduring (unless *E. graminea*), with tall or weak slender herbaceous stems, not suffrutescent even below.

Involucres narrow, long-pedicellate in open cymes soon exceeding the little reduced leaves. . .*E. Spruceana.*

Involucres subcampanulate, short-pedicellate, mostly in small terminal cymes little if at all longer than the reduced leaves.

Leaves canescent beneath with a short indument. *E. arenaria.*

Leaves glabrous both sides or indument more or less long-pilose.

Seeds pitted, ovoid; leaves pubescent, glabrate in age..... *E. Poeppigii.*

Seeds irregularly tubercled, broader than long; leaves glabrous or nearly..... *E. graminea.*

Petioles short, sometimes even obsolete, in any case very much shorter than the blades.

Erect, diffuse or spreading, if annual, leaves ordinarily 1 cm. long or longer, internodes soon usually longer, or plants obviously perennial, the often smaller leaves approximate, pubescence of annuals (if present) usually in part elongate, unequal in length.

Annuals or rarely more enduring but the stems or branches characteristically (at least in age) erect, rarely prostrate but internodes mostly longer than leaves; stipules present unless in *E. peruviana* and *E. tacnensis.*

Involucres unless in a variant in dense axillary and terminal leafless glomerules.

Plants distinctly pubescent..... *E. hirta.*

Plants glabrous or nearly..... *E. glomerifera.*

Involucres solitary or in few-flowered axillary cymes or, if terminal, dichotomous.

Gland appendages laciniate; stipules none *E. tacnensis.*

Gland appendages usually entire; stipules rarely obsolete.

Styles short, the stigmas not enlarged; leaves often oblongish, 1–3 cm. long; appendages entire or 2–3-lobulate.

Ovary typically glabrous (scarcely valid character).

Capsules wider below middle, 1.6 mm. long; cymes not very dense..... *E. hyssopifolia.*

Capsules widest at middle, to 1.4 mm. long; cymes dense..... *E. glomerifera.*

Ovary as capsule more or less pubescent as to types. *E. brasiliensis, E. hypericifolia.*

Styles to 1.3 mm. long, stigmas clavate or ellipsoid; leaves about oval, 4–12 mm. long; appendages usually crenate or dentate.

Stipules usually in 1–2 linear segments.

E. peruviana.

Stipules fimbriate; appendages crenate (always?).

E. Meyeniana.

Perennials, either low or prostrate herbs or suffrutescent at base and then especially often spreading-diffuse; leaves usually approximate.

Plants glabrous or merely pulverulent-pruinose.

Stipules undeveloped; glands unappendaged.

Leaves coarsely mucronate-dentate.*E. Hinkleyorum.*

Leaves entire or the denticulation minute, obscure.

Leaves obovate-subrotund, sessile or subsessile.

E. chilensis, E. huanchahana.

Leaves orbiculate, distinctly petioled.

E. raphanorrhiza.

Stipules developed; glands appendaged sometimes minutely or concolored.

Leaves orbiculate, shortly petioled; seeds smooth.

E. orbiculata.

Leaves obovate or at least oblique at base, subsessile.

Appendages white, showy, longer than glands.

E. Ruiziana.

Appendages nearly or quite concolor with glands, minute.....*E. melanocarpa.*

Plants obviously pilose, stipulate.

Involucres in part dichotomous; appendages broad, crenulate or rarely subentire.....*E. Meyeniana.*

Involucres all solitary; appendages narrow, entire, the red edge undulate.....*E. trancapatae.*

Depressed annuals (rarely more enduring) soon forming mats or cushions, the leaves ordinarily a few mm. long, the internodes usually about as long (1–2 or 3 mm.) unless in form of *E. micromera* and young plants of *E. hypericifolia;* pubescence often short or lacking.

Leaves entire or at least most of them, none denticulate unless obscurely at tip; seeds smooth or obsoletely and undulately rugulose.

Gland appendages obsolete or rudimentary; stipules distinct or none.....*E. micromera.*

Gland appendages obvious, often conspicuous; stipules a single membranous scale (except in mentioned species).....*E. serpens.*

Leaves denticulate, at least usually some of them; seeds usually rugose, at least granular; glands appendaged.

Capsules glabrous or sparsely villous; seeds not ridged but sometimes low-rugulose; involucres usually in short leafy cymes....*E. brasiliensis, E. hypericifolia.*

Capsules strigose or, if trichomes spreading, the seeds ridged.

Capsules strigose; seeds with low rounded concolored ridges; involucres 2–several on axillary branchlets. *E. thymifolia.*

Capsules tomentose or the trichomes crisped-spreading; seeds transversely deeply or closely sulcate or ridged.....*E. viatilis.*

Euphorbia adiantoides Lam. Encycl. 2: 426. 1788; B57.

Erect striate glabrous stems attaining several dm. and shortly dichotomously branched, the very slender branchlets fragile, about 1 dm. long; stipules setaceous; petioles elongate; leaves opposite, entire, thin-membranous, glabrescent, ovate-elliptic, subcuneate at base, obtuse, mucronulate, 2.5–3.5 cm. long; involucres in the upper axils and terminal, shortly pedicelled, turbinate, hirtellous with ovate fimbriate teeth, the ovate transverse glands a third narrower than the 5–6-setaceous-parted appendages; styles undivided; capsules hirtellous; seeds spheroid, tuberculate (ridges dentate in Weberbauer collections).—The Peruvian specimen may rather have come from Ecuador as now defined. This is a very delicate and singular plant with nearly the aspect of *Adiantum* of Montpellier (Lamarck). Croizat, suggesting that the affinity of *E. sciadophila* Boiss., B57, of southeastern Brazil with this species requires study, hints that the Peruvian plant may have a wide range. Standley referred the recent collections to *E. Poeppigii.* F.M. Neg. 32508 (Hartweg).

Tumbez: Rainy-green formation, near Hacienda La Choza, 150 meters, *Weberbauer 7706.*—Piura: Chanro, 250 meters, *Weberbauer 6002.* Without locality, *Jussieu,* type. Ecuador; Colombia; Argentina?

Euphorbia apurimacensis Croizat, Journ. Arnold Arb. 27: 289. 1946.

Small tree, 3–5 meters high, the pale brown bark lenticellate, the new shoots puberulent; leaves elliptic-obovate, shortly mucronate-acuminate, gradually narrowed to base, this more or less produced on the 5 mm. long petiole, 3–7 cm. long, 1–1.5 cm. wide, entire, glabrous except for the ciliolate slender spreading obscure veins; involucres single, puberulent, about 3 mm. long, 5 mm. wide at throat, glabrous, entire, erect; peduncle 5 mm. long, bractlets deciduous, subtriangular, 4–5 mm. long.—Related to *E. Latazi* HBK., B106, of Ecuador and Colombia with longer petioles (–2 cm.), peduncles and smaller involucres (Croizat), but it seems probable that these differences are individual rather than specific and that the plant is a part of *E. laurifolia* Juss., to which Diels referred the plant of HBK.

Apurímac: Quebrada de Matara, xerophytic slopes, 2–2,800 meters, Prov. Abancay, *Vargas 2290*, type.

Euphorbia arenaria HBK. Nov. Gen. & Sp. 2: 57. 1817; B56.

Erect herb, crisp pubescent, the indument on the leaves appressed and canescent beneath, the stems firm but fistulose as the opposite branches; petioles 8–16 mm. long; leaves opposite or ternate, oblong-elliptic or slightly ovate, entire, 3–5 cm. long, about half as wide, obtusish both ends, green and glabrate above, the floral petaloid, white, 3–4 mm. long, exceeding the involucres; cymes terminal with 5–7 heads, the peduncle to 7 cm. long; involucres subcampanulate, shortly pedicellate, appressed hirsutulous, the lobes fimbriate-dentate, glands 4, yellowish, hirsute without, entire, rounded; styles biparted; capsule hirsute; seeds obscurely tuberculate.—Capsule unknown in type but ovary described as globose, smooth, rarely with a few trichomes; therefore the above description probably applies only to var. *quitensis* Boiss. l.c., defined as glabrescent with smaller leaves, possibly distinct. F.M. Neg. 18039.

Ancash: Trujillo above Casma on coast, *Bonpland*, type. Ecuador? Colombia?

Euphorbia brasiliensis Lam. Encycl. 2: 423. 1788; B24.

Annual, usually erect, glabrous or patently pubescent, often several dm. high and more or less branched; stipules small, ciliate; leaves sessile or subsessile, oblong to ovate or obovate, oblique at base, subacute or obtuse, serrulate, 1–3.5 cm. long, those of the

axillary inflorescences narrower; involucres few, mixed with linear bracts, campanulate, glabrous; glands oblong or orbicular with rather conspicuous transversely elliptic white appendages; capsules white pubescent at least on backs of carpels, 2 mm. in diameter; styles deeply bifid; seeds subquadrangular, with 2–3 transverse ridges.—Lanjouw, in Pulle, Fl. Surinam 2, pt. 1: 95. 1932, noted that the inflorescence is not terminal as previously described. Wheeler, Rhodora 43: 143. 1941, has followed Mueller in suggesting, apparently with reason, that this is a variant of *E. hyssopifolia*, probably the only difference being the pubescent ovary and capsule. Cf. also *E. hypericifolia*. Illustrated, Miq. Stirp. Surin. Sel. *pl. 28* (as *E. Klotzschiana*).

Peru: Material that could be placed here is cited for convenience under *E. hypericifolia*, the earliest name for these closely related forms. Generally distributed in the warmer parts of the Americas.

Euphorbia chilensis Gay, Fl. Chile 5: 335. 1849; B103. *E. portulacoides* Spreng. Syst. 3: 792. 1826, not L.

Glabrous herb (rarely puberulent), the several spreading-decumbent stems ascending from elongate woody roots often 1–2 dm. long, branched above, densely leafy, with sessile obovate-subrotund sometimes oblanceolate leaves attenuate to base, usually 7–15 mm. long, 5–7 mm. wide, rounded at tip or, in var. *acutifolia* Boiss., apparently the typical state, oblong-lanceolate, acute; floral leaves like the lower, little smaller, terminating the dichotomous branches; involucres more or less pedicellate, hemispheric, the throat hirsute, as the oblong truncate 4-fibrillate lobes; glands purplish, transverse-oblong, subundulate, depressed punctate; capsules long-pedicellate, depressed, deeply trisulcate; seeds ovoid-subtetragonous, smooth, at least in some material so determined in herbaria, about 3 mm. long, light gray.—Doubtfully in Peru in typical state but compare the apparently scarcely distinct *E. huanchahana*. Possibly *E. caespitosa* Lam., B103, of Uruguay, low from tuberous root, leaves 8–12 mm. long, capsules acutely trigonous, not depressed, little sulcate, 4 mm. long and broad, may prove to be the earliest name for a variable species; intermediate apparently is *E. copiapina* Phil., B103, the deeply sulcate capsules about 2 mm. long, 3 mm. wide. My number *3071* placed for expediency under *E. huanchahana* matches closely material of *E. caespitosa* from Montevideo, except that it has the small capsules of *E. copiapina*, not, however, deeply sulcate!

Peru (possibly). Chile; apparently Argentina and Bolivia.

Euphorbia cotinoides Miq. Stirp. Surin. Sel. 96. 1850; B60. *Alectoroctonum cotinoides* (Miq.) Kl. & Gke. Abh. Akad. Wiss. Berlin 1859: 40. 1860.

A glabrous shrub sometimes several meters high, with articulated stems and ternate or opposite branches and leaves, the latter broadly ovate or elliptic, often subpeltate at the rounded base, apically rounded or usually obtuse or acute, 3–8 cm. long (petioles about as long), 1.5–5 cm. wide, rigid-membranous, glaucous beneath, entire, with 7–10 lateral nerves; stipules rounded, glanduliform or those of the floral leaves subulate; cymes axillary, lax, corymbose-paniculate, sometimes with peduncles 4–6 cm. long; involucres about 2 mm. long, sparsely hirtellous, the minute lobes fimbriate, the broad glands with larger white crenulate appendages; interfloral bractlets many, pubescent; ovary pedicellate; capsules apparently not yet described.—My *2907* has glabrous rotund leaves rounded at both ends, sparsely pubescent capsules, ovoid seeds little narrowed at obtuse tip, 2 mm. long, about 1.5 mm. thick, closely blunt-tuberculate, dark gray; the 4 appendages are green and subentire as in *E. viridis*, which it also resembles more in habit than *E. cotinoides* except for the broad leaves on elongate petioles, and perhaps it should be placed with *E. viridis* as a local variant. Someone has suggested it may be *E. caracasana* (Kl. & Gke.) M. Arg., but that at least typically has leaves hirsute on nerves beneath, 5 glands, oblong seeds irregularly foveolate and confluently scrobiculate. The leaves are used as fish "poison."

Tumbez: East of Hacienda Chicama, 900 meters, *Weberbauer 7655*.—San Martín: Tarapoto, *Spruce 4502* (det. Mueller); *Williams 5915* (det. Steyermark). San Roque, *Williams 7303*. Pongo de Cainarachi, *Klug 2674* (det. Steyermark).—Loreto: Yurimaguas, *Poeppig*.—Lima: In slide rock at Matucana, *2907?* To the Guianas. "Juquilla," "yuquillo" (Williams), "huarus" (Weberbauer).

Euphorbia glomerifera (Millsp.) Wheeler, Contr. Gray Herb. 127: 78. 1939. *Chamaesyce glomerifera* Millsp. Field Mus. Bot. 2: 377. 1913. *E. hypericifolia* of auth., not L., accord. to Wheeler, l.c. 73 et seq.

Slender, erect, usually glabrous (or nearly) annual, the often purplish stems commonly branched and attaining 1–several dm. in length, the axillary cymose peduncled inflorescences ordinarily dense and many-flowered; stipules ovate, dentate, ciliate; petioles very short; leaves oblong, oval or obovate, rounded or obtuse at the

strongly oblique base, serrate, paler beneath, mostly 1.5–3 cm. long; involucres very small, turbinate, hirtellous only within, the lance-triangular lobes lacerate-dentate; glands stipitate, suborbicular, with usually as wide, sometimes ovate white or reddish appendages; capsules glabrous, 1.5 mm. broad; seeds red, ovoid-trigonous, with conspicuous angles and irregularly rugose sides.—After Standley and Steyermark, Fieldiana: Bot. 24, pt. 6: 101. 1949. Croizat, Bull. Torrey Club 75: 407–408. 1948, wrote: "I accept this binomial as a matter of convenience . . . but I fail to see how this form can be extricated as a separate species out of the Old World *C. pilulifera* (L.) Small, *C. hypericifolia* (L.) Millsp. and *C. indica* (Lam.) Croiz.," a remark which seems, from even my casual observations, apropos.

Peru (probably). North to Mexico, southern United States and the West Indies.

Euphorbia graminea Jacq. Sel. Stirp. Amer. Hist. 151. 1763; B54.

Perennial, with erect or weak herbaceous, more or less procumbent stems, somewhat pubescent with spreading or crisped trichomes; stipules minute, subulate; petioles slender, elongate, the lower alternate, the upper opposite (or verticillate?), the leaves thin-membranous, entire, variable in shape, the upper usually elliptic-lanceolate, more or less narrowed or acute or rounded both ends, often several cm. long; involucres small, pedicellate in forks of branches and in terminal cymes, rarely glabrous, the ovate lobes fimbriate; glands 2–4, transversely ovate, narrower than the obovate subentire white or yellowish appendage; capsules glabrous; seeds tuberculate.—The type from Carthagena, Colombia; Svenson, Amer. Journ. Bot. 33: 460. 1946, described the seeds of a specimen from the coast of Ecuador as 1.5–2 mm. broad, 1 mm. long, terete, acute apex, gray with reddish dots, broad quadrate indentations, while another specimen det. as "affine" had seeds 2 x 1.5 mm. with wart-like excrescences; the Peruvian specimen, glabrous, woody below, leaves somewhat verticillate, had seeds 2.5 x 2 mm., ashy gray becoming black, with irregular obtuse ridges; evidently the group needs monographic study to determine the significance of these variations. Related species include *E. Fraseri* Boiss., B55, of Ecuador, with appendages narrower than the glands and *E. delicatula* Boiss., B55, herb. Pavón from Nova Hispana (maybe), the appendages much longer than the minute glands, nearly glabrous and involucres all long-pedicelled in axils.

Piura: Cerro Prieto, (*Haught & Svenson 11620*, det. Svenson, affine). To Mexico.

Euphorbia heterophylla L. Sp. Pl. 453. 1753; B72. *E. geniculata* Ortega Decad. 18. 1797. *E. elliptica* Lam. Encycl. 2: 425. 1788? *Poinsettia Ruiziana* Kl. & Gke. Abh. Akad. Wiss. Berlin 1859: 102. 1860.

Nearly glabrous or slightly pubescent erect annual, soon sparsely leafy or leafless below, simple or with few branches; petioles often long, slender but early short; leaves mostly alternate, upper opposite, varying greatly in shape, usually oblong-lanceolate to ovate but not rarely somewhat panduriform or even linear, entire or the irregularly dentate floral often red or pink at base; involucres commonly terminally congested, the lobes fimbriate, the normally solitary gland unappendaged; capsules 6 mm. broad, glabrous; styles bifid; seeds ovoid, acute, grayish or darker, irregularly tuberculate.—A linear-leaved variant, apparently in Peru, is var. *graminifolia* (Michx.) Engelm. The Lamarck plant may be distinct as thought by Croizat, who includes in it *E. geniculata* and *E. prunifolia* Jacq.; it is the elliptic-leaved form represented by my collections. The Mexican and widely cultivated Flor de Pascua (*E. pulcherrima* Willd.), well known for its bright red floral leaves and shrubby habit, is related to this weedy species.

San Martín: Abandoned land, Tarapoto, *Williams 6647* (det. Standley); *6285*.—Ancash: Lomas de la Choy, *Goodspeed 9221* (det. Standley).—Lima: In rock slide, San Gerónimo, *5894* (det. Johnston, *E. geniculata*). Matucana, cactus-boulder slope, *273* (det. Millspaugh, *P. geniculata*). Echarate (abandoned field), *Goodspeed 10471*. Barranca, *Beetle 9027* (det. Johnston).—Huánuco: Field weed, Pozuzo, *4670*.—Junín: Near Quirimi Bridge, *Killip & Smith 23934* (det. Croizat var. *graminifolia* following Boissier, with remark that critical study may prove it not the same as plant of United States). La Merced, stream course and shrubby trail edge, *5234; 5380* (det. Johnston).—Cuzco: Valle del Apurímac, Limatambo, 2,800 meters, (*Vargas 295*). Santa Ana, weed in cultivated land, *Cook & Gilbert 1524* (var. *graminifolia*, in part). Widely distributed in warm America. "Pascua;" "flor de pascua de monte."

Euphorbia Hinkleyorum Johnst. Contr. Gray Herb. 70: 72. 1924.

Glabrous perennial from a stout root, the many erect herbaceous stems laxly and dichotomously branched from about the middle;

stipules lacking; lower leaves alternate, few, upper and those of branches opposite, approximate, conspicuous, concolor, orbicular or obovate or subflabelliform, broadly affixed at the truncate base or cuneate dentate, 8–24 mm. broad and long, usually distinctly lacerate-dentate; involucres solitary in the axils, cyathiform, about 2 mm. long, peduncle about 1 mm. long, throat with subulate or narrowly deltoid lobes, hirsute, 0.5 mm. long; glands 5, 1.3 mm. long, sometimes slightly hirsute beneath, laminate-rugulose above, lip retuse or truncate-undulate; styles about 1.5 mm. long, stigmas little enlarged; seeds oblong, obscurely quadrangular, 2 mm. long, 1.3 mm. thick, ecarunculate, gray, delicately dark spotted.—Evidently belongs to Boissier's group *Ipecacuanhae*, B101, . . . but has larger, apparently connate (but actually distinct), broader leaves and more loosely branched habit. The collectors noted the plant used in the treatment of fevers.

Arequipa: Sandy pampa south slope, Chachani Mountain, 3,300 meters, *Mr. & Mrs. F. E. Hinkley 7*, type. Argentina; Bolivia? "Esquera" (Hinkley).

Euphorbia hirta L. Sp. Pl. 454. 1753; W169. *E. pilulifera* of auth. not L., l.c. *E. capitata* Lam. Encycl. 2: 422. 1788. *Chamaesyce hirta* (L.) Millsp. Field Mus. Bot. 2: 303. 1909. *C. pilulifera* of auth. accord. to Croizat, not L. which centers in *C. hypericifolia* (Bull. Torrey Club 75: 408. 1948).

Erect to decumbent or prostrate and often abundantly pubescent, with yellowish spreading trichomes or these sometimes lacking; subsessile or pedunculate cymose terminal and usually lateral heads of many cyathia and yellowish capsules characteristic for the species; internodes 1–4(–7) cm. long; petioles 1–2 mm. long; stipules attenuate, distinct or nearly, often linear-divided at base; leaves usually ovate-lanceolate or rhombic, also narrower, oblique at base, serrate, commonly 1–3 cm. long, acutish or rarely acuminate, sparsely strigose above, sparsely appressed puberulent beneath; involucre lobes ciliolate; white appendages narrower to twice as wide as the small stiped glands; ovary minutely strigose; seeds reddish, acutely ovoid-trigonous, 0.7–0.9 mm. long, transverse rugulose.—After Wheeler in part, who adopted the above synonymy, the reason for his action elucidated by Svenson, Amer. Journ. Bot. 33: 460. 1946. A well-marked variant, maybe distinct, of Piura and Ecuador, is var. *destituta* Wheeler, Contr. Gray Herb. 127: 70. *pl. 4c, fig. 1.* 1939, long internodes nearly glabrous, cyathia smaller, leaves acuminate,

seeds 0.7 x 0.3 (Svenson); Croizat, Journ. Arnold Arb. 24: 188. 1943, suggested this might be *E. microcephala* Boiss., B1262, of Bolivia, but that has obtuse leaves. When the plants are low and freely branched the cymules according to Wheeler are all terminal or on leafy branchlets and then referable to var. *procumbens* (DC.) N. E. Brown, a disposition agreed upon by both Croizat and Moldenke but under *Chamaesyce* as a subspecies or as a variety. Very near and maybe in Peru but glabrous even to ovary is *E. glomerifera* (Millsp.) Wheeler, W168. Illustrated, Wheeler, *pl. 657A*, opposite page 168.

This is one of the "herbas de la golondrina," used, according to Ruiz and Pavón, to destroy cataracts and as a purge. According to M. Martínez, whom Wheeler has thoughtfully quoted, the name "golondrina" is derived from the popular belief that the swallows which skim close to the ground upon which these spurges live are feeding on the seeds.

Piura: Piura to Nomala, *Weberbauer 5953* (var.). Cabo Blanco, *Haught 150; 54.*—Lima: Surco, *Ruiz & Pavón.* Near Lima, *J. Ball.*—San Martín: San Roque, *Williams 7681; 7327.* Pongo de Cainarachi, *Klug 2735.*—Junín: Chanchamayo, *Isern 2345.*—Huánuco: Tingo María, *Soukup 2270.* Balsaplaya, *Vargas 5345.*—Loreto: Yurimaguas, *Williams 3932; 4473; 5019.* Río Mazán, *Williams 8165.* Near Iquitos, *Klug 346; 1240.* Río Nanay, *Williams 278; 335.* Río Itaya, *Williams 3334.* La Victoria, *Williams 2903.*—Cuzco: Hacienda Santa Rosa, Prov. Convención, *Soukup 912.* Warm and temperate Americas and widely introduced elsewhere. "Golondrina," "yerba colorado," "urpai-mucuna" (Williams).

Euphorbia huanchahana (Kl. & Gke.) Boiss. in DC. Prodr. 15, pt. 2: 103. 1862. *Tithymalus huanchahanus* Kl. & Gke. Abh. Akad. Wiss. Berlin 1859: 71. 1860. *T. penicillatus* Millsp. Field. Mus. Bot. 4: 95. 1925.

Glabrous (type from a fleshy cylindrical root branched at apex); stems low, dichotomously much-branched, squamose, the slender decumbent branches leafy; leaves subsessile, obovate, often minutely serrate, attenuate at base, obtuse, 4–6 mm. long, entire, the floral basally subcordate; peduncles equaling the campanulate involucres, throat of these with oblong lobes ciliate, glands dark red, ovate, subtruncate.—The species proposed by Millspaugh seems to be the same and his observations may therefore be added to the description of Boissier: branches 7–14 cm. long, lower leaves 8–10 mm. long,

the upper ovate, apiculate, 12–15 mm. long, ciliate; glands orbicular, agaricoid, papillate, central stipe thick; styles about one-fourth bifid, penicillate; capsules depressed, trigonous, about 2 mm. high, 2.5 mm. wide; seeds ovoid-quadrangular, bluish-white, finally chocolate-brown, 2 x 1.8 mm., smooth, the ventral facet with 1 sulcus and 2 protuberances (these not observed by me). But the seeds of other fruiting material in Peru seem to be smaller than those of specimens determined as *C. chilensis*. Croizat, Journ. Arnold Arb. 24: 179. 1943, has defined under *T. huanchahanus* two variants, one Argentinian, the other Bolivian and subsp. *typica*, the glabrous leaves serrate; presumably then *E. chilensis*, which compare, is restricted to the narrow-leaved plant; but the larger seeds noted by me were from Argentine specimens.

Ruiz and Pavón noticed the roots (their sap viscid) used as a laxative and sold in the Lima market.

Ancash: Huaráz, *Raimondi 256*.—Lima: Matucana, grassy slope, *299* (type, *T. penicillatus*); *Savatier 1356*. Prov. Canta, *Ruiz & Pavón*, type (*E. tuberosa* in herb.).—Junín: Cerro de Pasco, grassy limestone slope, *3071* (det. Johnston, *E. chilensis*, reduced, 3 cm. high, root fusiform). Yauli, *Weberbauer 3760*. La Oroya, *Weberbauer 169*.—Cuzco: Paucartambo Valley, 3,500 meters, *Herrera 1371; 1389* (in herb. as *E. penicillata*).—Puno: Rocky siliceous slope, 4,200 meters, *Pennell 13483*.—Tacna: Candarave, 2,900 meters, *Weberbauer 7387?* (young). Bolivia; Argentina (Croizat). "Huachamccana," "huachancano," "chancano" (Ruiz & Pavón).

Euphorbia hypericifolia L. Sp. Pl. 1: 454. 1753; B23. *E. lasiocarpa* Klotzsch, Nov. Act. Acad. Leop.-Carol. 19, Suppl. 1: 414. 1843. *Chamaesyce hypericifolia* (L.) Millsp. Field Mus. Bot. 2: 302. 1909. *E. boliviana* Rusby, Bull. N. Y. Bot. Gard. 4: 442. 1907 as to Peru.

Apparently very similar to, if separable from *E. brasiliensis* and, if that is only a form of *E. hyssopifolia* with pubescent ovary, scarcely, of course, from the latter but as to plant of Klotzsch entire plant typically (but see below) crisply canescent, stems often divaricately branched, leaves oblong, rounded or subcordate at base, obtusish, or the narrower upper acute, usually all somewhat dentate; stipules shortly triangular; cymes rather densely corymbulose, floral leaves linear-lanceolate; involucres strongly hirtellous, glabrous within, the lobes triangular; appendages white, obovate, rather broader than glands, entire or 2–3-lobulate; capsules ovoid, typically appressed

yellowish hirsute, carpels rounded; seeds ovate-quadrangular with a few transverse rugae.—After Mueller. Wheeler, Proc. Biol. Soc. Wash. 53: 10. 1940, confirms from fragments of type his earlier opinion that the plants of Linné and Klotzsch are conspecific. Svenson, using the name of Klotzsch, Amer. Journ. Bot. 33: 460. 1946, "made a large number of collections to show the transition from pubescent plants with hairy capsules to plants perfectly glabrous throughout, erect to prostrate, from obvious annuals to perennials with thick roots; seeds usually elongate (1.1 x 0.45 mm.), the rather flat dorsal surface frequently white-coated when mature and usually with transverse ridges." These observations by so careful a student show that this species, if correctly identified as that of Klotzsch is variable and probably the plants maintained as species on these characters are variants of one. I have therefore cited all the Peruvian specimens that appear to belong here sens. lat. including at least *E. brasilensis*. *Mathews 502*, cited by Rusby as belonging to his species, no data and not seen, must have come from Peru; however, my *1298*, determined by Millspaugh as Rusby's species, seems, as determined by Johnston, to belong here. *E. lasiocarpa* has a strong resemblance to the North American *E. Preslii*, but has larger seeds and more prominent glands (Svenson). Diminutive young plants placed here could go to some other species as *E. serpyllifolia* Pers., W229, the involucres solitary, but apparently unknown south of Mexico.

Piura: East of Cabo Blanco, *Haught 107; 175*. Caña Dulce, *Haught 199*. Talara, *Beetle 26203*. Cerro Prieto, *Haught 151; (Haught & Svenson 11604)*. Quebrada Mongollon, Amotape Hills, *(Haught & Svenson 11519)*.—Ancash: Lomas de Mongón, San Rafael, *Goodspeed Exped. 9178*.—Lima: Beach near Supe, *Beetle & Horton 9084* (det. Johnston, *E. nutans*). San Lorenzo Island, *Anderson*. Canta, *Pennell 14596*. Atocongo, open sandy slopes, *Pennell 14784*. Lomas, Lurín, *5951*. Chillón near Viscas, *Pennell 14490* (det. Wheeler). Chosica, *505* (det. Millspaugh, *C. brasiliensis*).—San Martín: San Roque, *Williams 7009; 7443; 7798*. Lamas, *Williams 6438*. Chazuta, *Klug 4015*.—Huánuco: Tingo María, *Soukup 2265*. Stony slopes, *2327* (det. Millspaugh, *E. brasiliensis*); *3216* (det. Wheeler; Johnston, *E. brasiliensis*); *3235* (det. Wheeler); *3218* (det. Johnston). Ambo, river flat, *3186; 3187* (det. Johnston). Río Huallaga Cañon, *4232* (det. Wheeler). Piedra Grande, *3679* (det. Wheeler; Johnston).—Junín: Uspachaca, *1298* (det. Johnston). La Merced, *Killip & Smith 23414* (det. Standley).—Loreto: Yurimaguas, *Williams 4644* (det. Standley, *E. brasiliensis*).—Apurímac:

Open sandy places, *Goodspeed Exped. 10545* (det. Standley).—Cuzco: Hacienda Lucre, *Vargas 9758* (det. Standley). Near Cuzco, 3,000–3,600 meters, *Herrera.* Ollantaytambo, *Cook & Gilbert 482*(?)—Arequipa: Posco, *Cook & Gilbert 57.* Mollendo, *Hitchcock 22405* (or *E. serpyllifolia?*). South America to Mexico.

Euphorbia hyssopifolia L. Syst. Nat. ed. 10. 1048. 1759; W140. *Chamaesyce hyssopifolia* (L.) Small, Bull. N. Y. Bot. Gard. 3: 429. 1905. *E. brasiliensis* Lam. var. *hyssopifolia* (L.) Boiss. in DC. Prodr. 15, pt. 2: 24. 1862.

Ordinarily erect glabrous-stemmed annual or sometimes more enduring, simple or branched from the base, a few cm. to several dm. high; stipules mostly united, usually as broad as high, with slightly lacerate margin; petioles 1–1.5 mm. long; leaves lanceolate, often falcate to oblong, sometimes a little pilose toward the oblique base, 5–30 mm. long, usually serrate; cyathia solitary in the upper bifurcations and in few-flowered leafy cymes; peduncles glabrous, to 2 mm. long; bractlets linear; involucres obconic, 0.7–0.9 mm. in diameter, glabrous unless within at base of attenuate lobes and on stipes; glands circular to elliptical, the white or reddish entire appendages one-third as wide; flowers 4–15 per cyathium; ovary glabrous; capsules broadly ovoid, strongly 3-lobed, 1.6–2.1 mm. long; seeds ovoid-subtriangular, 1–1.4 mm. long, chocolate-brown to grayish-white, low smooth ridges defining shallow depressions.—After Wheeler. Probably should include *E. brasiliensis* as a variant with pubescent ovary; unfortunately Boissier, who did so, used the earlier name as the varietal. *E. maculata* L. has stems usually crisply pubescent at tip, smaller seeds finely rugose and is to be expected as widely distributed; but according to Wheeler (at one time) the true *E. maculata* could be *E. hyssopifolia;* see Fosberg, Bull. Torrey Club 74: 332. 1947, however, for discussion and references pertaining to application of name, and Croizat, l.c. 75: 188. 1948, for a reply. *E. ammannioides* HBK., mentioned under *E. serpens,* might be sought here. Illustrated, Wheeler, *pl. 656D,* opp. p. 101.

Peru: Scarcely in typical form; see note above. Temperate South and North America.

Euphorbia laurifolia Juss. in Lam. Encycl. 2: 418. 1788; B106. *E. Latazi* HBK. Nov. Gen. & Sp. 2: 58. 1817 and *E. cestrifolia* HBK. l.c. 59, fide Diels, Bibl. Bot. 116: 104. 1937. *E. Lehmanniana* Pax, Bot. Jahrb. 26: 508. 1899, fide Diels, l.c.

Glabrous shrub 2–6 meters high, with terete stout cicatrose branches, apically foliate and axillary cymes, the upper peduncles with 3 heads; leaves crowded, shortly petioled, oblanceolate-oblong, entire, 1–1.5 dm. long, 2–3 cm. wide, at least the lower more or less spreading-deflexed; cyathia green, 5 mm. long, 8 mm. wide, primary lobes denticulate, hirtellous, 1.5–2 mm. long and wide, glands fleshy, 1–1.5 mm. long, 3.5 mm. wide, hirsute without, otherwise glabrous; stamens 25–30, filaments 4 mm. long, anthers yellow, 1–1.5 mm. long; bracts 2–3 mm. long, lacerate-hirsute (after Diels).

Cajamarca(?): Near Jaén(?), *Weberbauer 6295*.—Apurímac: Near Curahuasi, rocky places, *Vargas 9157; 9821* (det. Standley). Pincos, rainy-green shrubland, in rocks, 2,700 meters, *Stork & Horton 10662* (det. Standley).—Puno: Ollachea, Prov. Carabaya, *Vargas 6938*. Without locality, *Jussieu*, type. To Colombia. "Latzi" (Bonpland, Colombian).

Euphorbia melanocarpa Boiss. in DC. Prodr. 15, pt. 2: 41. 1862.

Completely glabrous with black ligneous stems; branches filiform, decumbent, 7–15 cm. long, the internodes longer than the lower leaves, these in type 4–6 mm. long and wide, thickish, entire, ovate-orbicular, the lower petioled with obliquely truncate base, the gradually smaller upper cuneate at base; stipules triangular, coalescent, shortly fissate; involucres solitary in the upper axils, typically purplish-black with oblong fissate lobes equaled by the pedicels, the transverse ovate porous-punctate glands black, the concolored (in Peru lighter) very narrowly appendaged margin repand; styles bifid; capsules glabrous, blackish-purple; seeds ovoid-tetragonous, obsoletely rugulose-tuberculate.—The Peruvian material, my collections determined by Millspaugh, has somewhat smaller leaves, shorter internodes and the dark coloring described for the type is less pronounced.

Junín: Prostrate in heavy stony dry "wash," Tarma, *1010*. Prostrate on firm stony river flat, La Oroya, *982*. Near Huancayo, 3,400 meters, open rocky hillside, leaves flat on ground, *Killip & Smith 22023* (det. Killip). Ecuador.

Euphorbia Meyeniana Klotzsch, Nov. Act. Acad. Leop.-Carol. 19, Suppl. 1: 414. 1843; B42. *Chamaesyce Meyeniana* (Kl.) Croizat, Journ. Arnold Arb. 24: 184. 1943.

Entire plant densely and crisply cinereous velutinous, the procumbent stems divaricately branched; stipules minutely fimbriate;

leaves subsessile, cordate at base, ovate or oblong, to about 1 cm. long, obtuse, rather coarsely and acutely serrate; involucres dichotomous and in upper axils, campanulate-turbinate, hirsute as the ovate lobes within and without, the ovate glands with white obovate much broader entire or subentire appendages; styles longer than 1 mm., bifid, clavate apically; capsules hirtellous, cocci subcarinate; seeds oblong, acutely tetragonous, under lens finely papillose as well as rugulose.—Var. *viscidula* Boiss. similar to type but glutinose. The type was from the Bolivian side of Lake Titicaca. In the scrap seen the appendages are slightly crenate. The Ecuadorean *E. melanocarpa* Boiss. in DC. Prodr. 15, pt. 2: 41. 1862, placed near this by the author and in general similar, is completely glabrous, while *E. quitensis* Boiss. l.c. p. 43 has very oblique leaves rounded at base, oblong, a little hirtellous at the stems. F.M. Neg. 18059.

Arica: *Lechler 1557* (type of the var. in herb. as *E. maculata*). Northern Bolivia; Paraguay.

Euphorbia micromera Boiss. ex Engelm. Proc. Amer. Acad. 5: 171. 1861; W194. *Chamaesyce micromera* (Boiss.) Woot. & Standl. Contr. U. S. Nat. Herb. 16: 144. 1913.

A prostrate small-leafed annual with very slender dichotomously branched glabrous or pubescent stems and shortly petioled (petioles 0.5 mm. long) obliquely rounded ovate or oblong obtuse entire leaves only about 3 (2–7) mm. long; stipules linear-lanceolate, ciliolate, the lower often united; involucres axillary, solitary, ovoid-globose, glabrous with ciliate lobes; glands pink or red, orbicular or oblong, unappendaged, or in pubescent plants with minute white margins; bracteoles reduced to solitary pink appendage; ovary glabrous to pubescent; carpels slightly grooved dorsally; capsules about 1.3 mm. long; seeds narrowly oblong, sharply tetragonous, 1.1–1.3 mm. long, smooth or obsoletely 2–3 undulately rugulose.—The specimen of Pennell seen has some leaves with a few denticulations, narrow but obvious gland appendages. Illustrated, Wheeler, *pl. 658C*, opp. p. 169.

Piura: La Brea, (*Haught & Svenson 11586*). Shale cliff above sea, Paita, *Pennell 14815*, det. Wheeler; *Haught 51*. Talara, *Beetle 26202*. Parinas Valley, *Haught 116*.—Cajamarca: Near Cajamarca, *Osgood & Anderson* (very young; det. Millspaugh *E. quitensis* Boiss., 43, but that with broad appendages). Mexico and southwestern United States.

Euphorbia Milii Des Moulin, Bull. Hist. Nat. Soc. Linn. Bordeaux 27–30. *pl. 1.* 1826; B79. *E. splendens* Bojer ex Hook. Bot. Mag. *pl. 2902.* 1829.

Erect to dependent or more or less scandent spiny shrub with small (1–5 cm. long) membranous subsessile obovate leaves, many conspicuous often brown-red spines on the similarly colored thick branches and long-peduncled cymes from the upper leaf-axils, the bright red bracts showy; involucre campanulate with fimbriate ovate lobes and fleshy red glands; seeds tuberculate.—This is one of a number of plants which, in some part, may be fluorescent; here bluish-white and from the roots (see Goodwin and Kavanagh, Bull. Torrey Club 75: 1–17. 1948). Doubtfully ever adventive in Peru but its bizarre appearance makes its name of interest wherever cultivated. Croizat, Journ. Arnold Arb. 21: 506. 1940 and later, called attention to the correct scientific name which Boissier had indicated applies to the same species, but the native name of Madagascar seems somehow more suitable! Illustrated, l.c. and many others as Bailey, Stand. Cycl. Hort. 1170.

Loreto: Cultivated at Pebas, *Williams 1821.* Río Mazán near Iquitos, *Williams 8137.* Madagascar. "Corona de Cristo," "soongo-soongo" (Bojer).

Euphorbia orbiculata HBK. Nov. Gen. & Sp. 2: 52. 1817; B31.

Glabrous, branched from the base, the diffuse or ascending dichotomously much-branched filiform stems about 1 dm. long, shrubby below; leaves thick, rounded at base, orbiculate, 4–5 mm. wide, entire; stipules minute, denticulate, in type subulately incised, often subconnate into a solitary interpetiolar one; flowers axillary, solitary, subequaling the leaves; involucres dichotomous and terminal, the throat hirtellous, the red, transversely oblong glands equaled by the white, entire or obsoletely repand semi-orbicular appendages; styles shortly bifid; cocci carinate; capsules mostly glabrous; seeds blackish, obtusely ovoid-tetragonous, smooth.

Peru (probably). Colombia; northern Bolivia.

Euphorbia Peplus L. Sp. Pl. 456. 1753; B141.

Glabrous annual, the greenish-yellowish stems often curved-ascending at base, the more or less promptly deciduous leaves slender-petioled, the many (in age) erect branches with sessile obovate very thin leaves, these usually 1–2 cm. long, acute at base, rounded at

summit, the uppermost verticillate; bracts deltoid or broadly ovate; involucres subsessile, campanulate, fimbriate; glands semilunate, much broader than long and provided with slender or filiform horns; capsules deeply sulcate, narrowly alate-carinate, the whitish-oblong-ovoid seeds with 1–4 transverse rows of darker gray pits.—Young plants may be simple with 2–3 flowering branches at apex. Illustrated, Rept. Mo. Bot. Gard. 11. *pl. 30*, and many others.

Lima: In ditch, *Killip & Smith 21667*. Supe, in *Salix* thicket near seashore, *Eyerdam 9069* (det. Johnston).—Huánuco: Near Huánuco, *Sawada P 61*.—Junín: Carpata above Huacapistana, *Killip & Smith 24412*.—Cuzco: Yucay, *Soukup 746*. Naturalized from Europe and Asia.

Euphorbia peruviana Wheeler, Contr. Gray Herb. 127: 59. *pl. 3a*. 1939. *Chamaesyce arequipensis* Croizat, Journ. Arnold Arb. 25: 194. 1945.

Often more or less spreading hispid-pilose or sometimes glabrous annual, the 1–4 erect or suberect stems 4–8 cm. high; stipules often obsolete or obscure, or 1–2 linear segments 0.6–1 mm. long; leaves approximate, sparsely pilose to glabrate, ovate, oval or oblong, 4–8 (–15) mm. long, about as wide, subentire or irregularly dentate, petioles 1 mm. long; cyathia solitary (pedicels to 4 mm. long), cupulate-campanulate, 1.7–2 mm. in diameter, pilose; glands transverse-oblong, 0.8–1 mm. long, the one and a half to twice as wide white appendages irregularly dentate; styles 1.1–1.3 mm. long, one-third to one-fourth connate, bifid, the stigmas ellipsoid; capsules sparsely pilose, acutely 3-lobed, 2.3 mm. long, immature seeds quadrangular, about 1.7 mm. long, smooth.—Distinguished from all other species of subgenus *Chamaesyce* by the extra long styles with thickened tips (Wheeler), but those of *E. Meyeniana*, known to me only from a scrap, seem to be the same. Also the Croizat plant (to my regret) appears to be identical except it is slightly more pilose; the distinctive (according to Wheeler) styles are equally obvious. A duplicate specimen by Metcalf has a firm ascending base but collector wrote "annual."

Arequipa: Dry stream bed, Caraveli to Atico, 1,800 meters, (*Metcalf 30341*, type, *C. arequipensis*).—Moquehua: Mount Estuquiña, *Weberbauer 7441*, type.

Euphorbia Poeppigii (Kl. & Gke.) Boiss. in DC. Prodr. 15, pt. 2: 56. 1862. *Leptopus Poeppigii* Kl. & Gke. Abh. Akad. Wiss. Berlin 1859: 46. 1860.

Erect, attaining several dm., alternately and dichotomously branched from often decumbent base, the branches dichotomous, glabrous, more or less reddish; leaves petioled, somewhat appressed pilose-hirsute, ovate, obtuse, the larger 10–12 mm. long; stipules minute, glanduliform; involucres shortly pedicelled in the axils and terminal, turbinate, hirsute without and in the throat, the oblong lobes fimbriate, the ovate glands with obovate, shortly 3–4-dentate, greenish-white appendages more than twice as long; styles short, bifid; capsules hirtellous; seeds ovoid.—The larger, more openly branched var. *laxa* Boiss. has the leaves less pubescent and is of doubtful taxonomic merit. Determinations by Standley for Junín and Ayacucho except as noted. F.M. Neg. 32515 (var.).

Huánuco: Piedra Grande near Muña, *3676* (det. Johnston). Pozuzo, *4595* (det. Johnston).—Junín: Carpapata, *Soukup 3451*. Huacapistana, *Killip & Smith 2260*. La Merced, *5281* (det. Johnston); *Killip & Smith 23436*.—Loreto: Yurimaguas, *Poeppig 3118*, type; *Spruce 3908* (type, var.).—Ayacucho: Aína, *22701; 23098*. Ccarrapa, *Killip & Smith 22427*.—Cuzco: Colpani, Urubamba Valley, *Cook & Gilbert 1045; Vargas 755*. Quellomayo, Prov. Convención, brushy banks, *West 8027* (det. Wheeler).—Puno: Sandía, *Weberbauer 509*. Bolivia. "Monte huachanca" (Cook & Gilbert).

Euphorbia raphanorrhiza (Millsp.) Macbr., comb. nov. *Tithymalus raphanorrhizus* Millsp. Field Mus. Bot. 4: 95. 1925.

Glabrous perennial, the few filiform branches prostrate from a fusiform root; stipules none; leaves petiolate, the lower scattered-alternate, crenulate, obtuse, the upper opposite, crenulate-serrate, acute to apiculate, all orbicular; inflorescence solitary in the axils, sessile, involucres campanulate, the oblong lobes fibrillate at apex; glands transversely ovate, thick, stiped, the stipe prolonged to the base of the tube; styles bifurcate one-third, the stigmas globose; capsules glabrous, deeply trigonous; seeds triangular ovoid, white, 2 x 1.5 mm., the facets smooth, the angles sharp; caruncle or funicular vestigial, papyraceous papillate.—Section Ipecacuanhae (Millspaugh).

Lima: Steep, lichen-covered, western slope, Matucana, *85*, type.

Euphorbia Ruiziana (Kl. & Gke.) Boiss. in DC. Prodr. 15, pt. 2: 31. 1862. *Anisophyllum Ruizianum* Kl. & Gke. Abh. Akad. Wiss. Berlin 37. 1859.

Suffrutescent from subligneous rhizomes, the filiform or slender prostrate stems 1–1.5 dm. long, minutely pruinose hirtellous under a lens; leaves subsessile, glabrous, thick, 3–5 mm. long, to 4 mm. wide, subcordate, obovate, obtuse, minutely apiculate, entire or paucidentate apically; stipules ciliate; involucres axillary and terminal, solitary or 2–3, the throat as lanceolate lobes densely hirsute; glands ovate, puncticulate with short biparted appendages or unilateral, liguliform and twice as long as gland; capsules glabrous, cocci carinate, style elongate, deeply bifid; seeds oblong-tetragonous, in my specimens brownish, faintly striate, about 1.5 mm. long.—*E. Jamesoni* Boiss. l.c. of Ecuador has larger leaves twice as long, appendages elegantly petaloid (Boissier). F.M. Neg. 18063.

Lima: Lima and Chancay, *Ruiz & Pavón*, type (*E. striata* in herb).—Huánuco: Disintegrating shale and gravel slopes, *3213; 3517; Ruiz & Pavón* (det. Mansfeld).

Euphorbia serpens HBK. Nov. Gen. & Sp. 2: 52. 1817; W198. *Chamaesyce serpens* (HBK.) Small, Fl. Se. U. S. 709: 1333. 1903.

Glabrous prostrate annual (sometimes enduring?), the slender stems to 5 dm. long and sometimes rooting at the nodes, these to 3 cm. distant; stipules all united into a white membranous lacerate scale about equaling the less than 1 mm. long petiole; leaves ovate-orbicular to oblong, oblique at base, entire, 2–7 mm. long and wide; peduncles to 2 mm. long; cyathia solitary at nodes; involucres turbinate, 1 mm. long and broad, glabrous unless for a few trichomes on margins, acute or acuminate at least as long as the transversely oblong ochroleucous glands, their white, little wider appendages mostly crenate; fifth gland longer; flower parts completely glabrous including the 3-lobed ovary and markedly clavate styles, these usually more than medially parted; capsules about 1.2 mm. broad; seeds smooth, ovoid, the more or less prominent angles rounded, about 1 mm. long, 0.5 mm. in any diameter.—After Wheeler. The more northern ranging *E. ammannioides* HBK., W128, with distinct stipules, appendaged glands, larger seeds, regularly of coastal sands, is to be expected in the Lomas. Illustrated, Wheeler, l.c. *pl. 661C*, opp. p. 192.

La Libertad: Chicama Valley, in a garden, *Smyth 84* (det. Wheeler).—Lima: Prostrate mats on seaside plain, Callao, *5885* (det. Johnston); also *Dombey; Gaudichaud.* Lurín, *Pennell 12208* (det. Standley). To Paraguay, Mexico, Venezuela and introduced northward.

Euphorbia Spruceana Boiss. in DC. Prodr. 15, pt. 2: 53. 1862.

Perhaps perennial but the several dm. tall flexuous glabrescent stems herbaceous; stipules conical, subulate; leaves petiolate, the upper 3–5-verticillate, all sparsely hirtellous, entire, ovate from rounded base, 18–22 mm. long, 14–16 mm. wide (Klug specimen, to 5 cm. long, 3 cm. wide); cymes terminal, sometimes dichotomous, exceeding the upper leaves, the bracteolate branches 8–12 mm. long; floral leaves lanceolate-subulate; involucres narrowly turbinate, lateral mostly aborted, glabrous, the lobes lanceolate, the binate glands transversely ovate, concave as the slightly wider appendages; capsules 3 mm. wide, depressed, sparsely hirtellous, the cocci subcarinate; seeds ellipsoid, deeply pitted, about 1 mm. thick, 1.3 mm. long (Klug).—F.M. Neg. 18067.

San Martín: Tarapoto, *Spruce 4378*, type. Juanjuí, *Klug 3917* (det. Standley, *E. cotinifolia*?). "Yuquillo" (Williams).

Euphorbia tacnensis Phil. Anal. Mus. Nac. Chile, Bot. 77. 1891.

Erect pubescent little annual with few lower leaves, the upper opposite, oblong, equally acuminate both ends, shortly petioled, nearly glabrous, concolor; stipules none; cymes terminal, dichotomous, rather many-flowered; involucre glands pectinate and with white pectinate appendages; capsules glabrous; seeds coarsely tuberculate.—After Philippi and obscure to me; maybe perennial?

Tacna: Near Tacna, (*Philippi*, type).

Euphorbia Tessmannii Mansf. Ber. Deutsch. Bot. Ges. 46: 674. *figs. A & E.* 1929.

Unbranched glabrous 3-meter tree, the trunk of type 4 cm. in diameter; petioles about 6 cm. long; leaves alternate, oblanceolate, gradually narrowed to base, abruptly caudate-acuminate, 27–36 cm. long, 7.5–10 mm. wide, drying pergamentaceous, marginally minutely revolute, rather densely pinnate-nerved, the lateral nerves about rectangular, scarcely conspicuous; inflorescence including the peduncle about 1.5 dm. long, laxly branched dichotomously, the ovate bracts soon deciduous, ultimate equaling the cyathium; involucre 3 mm. long, cyathiform, with 5 rotund-ovate lobes, pedicels 3 mm. long, glands 5, depressed, shortly stiped, male flowers 5, the involucre with 2 broadly obovate exterior lacerate-dentate bractlets connate and laterally adnate to the included involucre; central female with 5-lobulate disk.—Belongs to the Laurifoliae of

Section Tithymalus and nearest *E. elata* Brandegee of Mexico, with which it shares the distinctive character of partly adnate bractlets (Mansfeld). This description is from the author's, Notizbl. Bot. Gart. Berlin 11: 137. 1931. F.M. Neg. 5186.

Loreto: Flood-free wood, mouth of the Santiago, *Tessmann 4071*, type.

Euphorbia thymifolia L. Sp. Pl. 454. 1753; W252. *Chamaesyce thymifolia* (L.) Millsp. Field Mus. Bot. 2: 412. 1916.

Prostrate glabrate or pubescent annual (or more enduring?), the much-branched stems forming mats; petioles 0.5–1 mm. long; stipules about 1 mm. long, linear-subulate, entire or parted, distinct or nearly, fimbriate; leaves opposite, elliptic to narrowly oblong or ovate-lanceolate, rounded or acute, oblique at base, serrulate, nearly glabrous above, to 10 mm. long, ordinarily shorter; cyathia subsessile, mostly in small cymes of 2–several on short lateral branchlets; involucres broadly obconical, soon distended by partly enclosed capsule, strigose above including the lobes, only the distal equaling the red glands; appendages twice as long to rudimentary; ovary densely pubescent; capsules subappressed puberulent; seeds sharply quadrangular, reddish, transversely rugose, 0.8–0.9 mm. long.—A common tropical weed of both hemispheres, and found at Salinas, Ecuador, by Svenson. After Wheeler. Illustrated by him, *pl. 655A* opp. p. 100.

Peru: Without locality, *Ruiz & Pavón* (det. Mansfeld). Coastal Ecuador and widely distributed in tropics.

Euphorbia trancapatae (Croizat) Macbr., comb. nov. *Chamaesyce trancapatae* Croizat, Journ. Arnold Arb. 27: 290. 1946.

Repent from stout root, often with many woody rosulate branches, the internodes 2.5 cm. long or shorter, all gray lanuginose; petioles less than 1 mm. long; stipules interpetiolar, acute, suberect, not abundantly lanate; basal leaves rotund, subentire, about 3 mm. long, the other (anisophyllous) leaves round-triangular to 10 mm. long, 5 mm. wide, serrate, gray or white lanate both sides; involucres solitary, about 2 mm. long, 1.5 mm. wide; 5 glands plicate, narrow appendage entire, pale rose or whitish; ovary pedicelled, hispid-lanate; styles short, bifid, stigmas minute.—Certainly not *E. boliviana* Rusby. The young vigorous shoots identify it easily by their heavy pubescence; the leaf shape suggests small forms of *E. hirta* L. (Croizat). But compare the apparently too similar *E. Meyeniana*.

However there seems to be a difference—how constant to be proved by more collections—in the shape of the merely undulate appendages. I am indebted to my friend Dr. C. Vargas C. for the loan of the original material.

Apurímac: Cuzco boundary, Cuahuasi, Trancapata, 2,800 meters, stony slopes, *Vargas 1257* (*1237;* type, Univ. of Cuzco).

Euphorbia viatilis Ule, Verh. Bot. Ver. Brandenb. 50: 85. 1908.

Prostrate filiform stems as all parts densely tomentose villous; stipules lanceolate-subulate, laciniate-hirsute, 1.5–2 mm. long; petioles 1 mm. long; leaves ovate-oblong, slightly inequilateral at subcordate base, obtusish or rounded, denticulate, about 6 mm. long, half as wide; involucres few, in axillary, nearly sessile cymes, turbinate, villous without, lobes lanceolate, fimbriate-hirsute, glands 4, transversely elliptic, appendaged, the 2 larger 1.5 mm. wide, oblong- or ovate-elliptic, repand, 2 much smaller broadly elliptic, all yellowish-white; stamens 5–7; ovary and capsules villous, the latter 1 mm. high, 1.5 mm. wide; styles short, pilose, bifid, 1.5 mm. long; seeds red-brown, transversely and deeply 4–5-sulcate.—A small low woolly annual with delicate branches, related to *E. prostrata* Ait., W265, staminate flowers 4, involucres axillary, seeds closely ridged (*E. Chamaesyce* L., see Croizat, Bull. Torrey Club 72: 213–318. 1945) but woolly pubescent disk thick and appendaged, and more numerous stamens (Ule). It suggests too *E. dioica* HBK., of Mexico and Central America with typically more numerous involucres, the appendages glabrous; and *E. densiflora* (Kl. & Gcke.) Kl., known from as near as Panama and apparently, ex char., unless more delicate, scarcely distinct.

San Martín: Tarapoto, streets and dry places, (*Ule 6839*, type).

Euphorbia viridis (Kl. & Gke.) Pavón ex Boiss. in DC. Prodr. 15, pt. 2: 62. 1862. *Alectoroctonum viride* [Pavón] Kl. & Gke. Abh. Akad. Wiss. Berlin 1859: 39. 1860. *E. Mandoniana* Boiss. l.c. 1264, at least as to Peru.

Glabrous fleshy tortuous-stemmed and more or less ligneous, the flexuose dichotomous branches herbaceous; petioles about 1 cm. long, ternate in type; leaves ovate, rounded or acute at base, obtuse, 1–2(–3) cm. long, the opposite floral lanceolate acutish; cymules terminal, forming a leafy panicle of 3–5 heads, the shortly pedicelled hemispheric involucres glabrous except the hirsutulous throat, the

ovate lobes dentate; glands usually 4, oblong, with broader suborbicular denticulate greenish or reddish appendage; styles bifid; capsules deeply trisulcate, about 3 mm. broad, cocci rounded; seeds ovoid-subtetragonous, apically abruptly attenuate, irregularly foveolate and densely tuberculate.—The allied *E. haematantha* M. Arg., B63, of Ecuador is lightly pubescent, with filiform procumbent stems, purple involucres and the glands with purple deeply 4–5-dentate appendages. My collections were referred by Millspaugh to *E. Mandoniana*, said to have seeds not tuberculate; probably this is variable in Peru at least. F.M. Neg. 32511 (Mandon).

Piura: Stems black, leafy only one month, Cerro Prieto, *Haught 153; 154.*—Lima: Cheuchín, *Ruiz & Pavón*, type. East of Sayán, 1,550 meters, Prov. Chancay, *Goodspeed 33028* (det. Croizat, *E. Mandoniana*). Chosica, rocky hillside, branched only above, *2872;* fleshy-woody among large rocks, 8 dm. high, *490.* Matucana, woody at base, spreading in loose granite *277.* Huariaca, *3127.*—Huánuco: Yanahuanca, *1245.* Muña, slender half shrub 1 meter high, brush-lands, *3943.* Piedra Grande, loose soils, grass-shrub slopes, *3677; 3704.* Bolivia?

Euphorbia Weberbaueri Mansf. Repert. Sp. Nov. 29: 221. 1931.

Cactus-like shrub with succulent alternate lax branches, the ligneous obtusely longitudinally carinate-costate erect or suberect branchlets 5–8 mm. in diameter; innovations articulate; leaves rudimentary, scale-like, 1.5 mm. long, 1 mm. wide, ovate-triangular; cymes very short from lateral axillary pulvinus, cyathia mostly 3, subsessile, basal foliar leaves 2, opposite, 2–8 mm. long, glabrous, the obovate lobes lacerate; glands 4, transverse-elliptic or subsemilunate, concave, obscurely bilabiate, unappendaged, very shortly stiped; capsules glabrous, 4 mm. in diameter; cocci dorsally obtusely carinate; seeds small, brown, verrucose or nearly smooth.—Placed by the author in a species-group which he defines to include the interesting Brazilian species *E. phosphorea* Mart., B176, named in reference to the phosphorescent sap; however Croizat, Journ. Arnold Arb. 24: 182. 1943, thinks the plant of Martius requires another position.

Cajamarca: Open areas in cactus-shrub formation, 900 meters, *Weberbauer 3802*, type. Side valley to the right of the Río Huancabamba, rain-green formation, *Weberbauer* (without number).

2. PEDILANTHUS Necker or Poiteau in 1812

Reference: Millspaugh, Field Mus. Bot. 2: 353–377. 1913.

Erect copiously lactiferous shrubby plants more or less fleshy above and often nearly or quite leafless, the alternate entire succulent leaves usually falling soon after the appearance of the oddly shaped monoecious flowers, which actually owe their curious appearance to the ordinarily shoe-shaped and colored enveloping involucre. Involucres in terminal or axillary cymes, cleft on upper side, bilabiate, the tip of lower lip bifid and the fissure more or less closed by 3 lobes, the tube at base above with a bifid or 2–3-lobed spur-like appendage. Flowers pedicellate, the male numerous, the solitary female with finally exserted usually declinate style with 3 often apically distinct stigmas. Ovary 3-celled, ovules solitary. Fruit capsular, the seeds ecarunculate.—Croizat, Journ. Wash. Acad. Sci. 33: 19. 1943, expressed the opinion that "the cyathium is homologous with a much coarctate inflorescence of *Dalechampia*, the upper part of the inflorescence which bears glands and male flower being replaced by a chamber with glands in *Pedilanthus;* the genus can readily be keyed on floral characters." But these, according to Standley & Steyermark, Fieldiana: Bot. 24, pt. 6: 141. 1949, are of doubtful significance.

Pedilanthus retusus Benth. in Hook. Journ. Bot. Misc. 6: 321. 1854; 355.

Glabrous shrub a meter or so tall; leaves subsessile at the cuneate base, obliquely ovate, retuse, lightly carinate beneath, 2.5–5 cm. long, 2–3.5 cm. wide; cymes short, terminal and in the upper leaf-axils; involucres about 9 mm. long; glands 4, upper truncate lip 3 times shorter than tube; upper lobes of lower lip glandular; pedicels of both male and female flowers hirsute; capsule 6–7 mm. long, 9 mm. thick, the cocci rounded, the seeds subcarinate dorsally.—Near the widely distributed, sometimes cultivated *P. tithymaloides* (L.) Poiteau, with acute or merely obtuse leaves and the pedicel of the female flower glabrous.

Loreto: Iquitos and vicinity, *Williams 3567; 8133.* Upper Amazonian Brazil. "Zapatillo del Niño," "zapatito del Niño."

3. PHYLLANTHUS L.

Reference: Mueller, Argoviensi, in DeCandolle Prodr. 15, pt. 2: 274–436. 1866.

Various in habit (one species aquatic), herbaceous or ligneous, with entire usually alternate often distichous leaves that on the branchlets may appear to be pinnate, the petioles short or wanting. Flowers usually monoecious, solitary or in clusters in the axils, sometimes in short inflorescences, apetalous, with 4–6 imbricate free or nearly free sepals, the male flower with disk glands free or annulate, stamens 3–6, filaments sometimes connate, ovary rudiment always absent, the female disk often urceolate, ovary 3–5-celled, styles free or connate, 3, bifid or lobed; ovules 2. Capsules dry at least at maturity separating into bivalved cocci, the ordinarily 3-angled seeds ecarunculate.

Without a modern revision, greatly needed, this compilation is no doubt incomplete. Besides the following, the distinctive shrub or tree of India (*P. acidus* (L.) Skeels), known in English cultivation as "Indian gooseberry" from the fleshy juicy green or yellowish fruits, may be planted in Peru since it is not uncommon in tropical gardens; it is a shrub or small tree with leaves 3–5 cm. long and wide and unlike other Peruvian species has the flowers in raceme-like panicles clustered on the stems.

Herbs, in Peru annuals or rarely more enduring and the stems firm or subligneous only toward the base; leaves mostly 1 cm. long or shorter.

Aquatic, *Salvinia*-like on slow waters..... *P. fluitans.*

Terrestrial.

Leaflets nearly round; anther connective often accrescent. *P. orbiculatus.*

Leaflets nearly oblong; anther connective not enlarged.

Stems subterete above, neither bi-ridged nor margined, often with several short spreading branches.

Leaf nerves obvious; filaments more or less free; seeds minutely verruculose-scabrous..... *P. lathyroides.*

Leaf nerves faint or obscure; filaments connate; seeds faintly lineate..... *P. Niruri.*

Stems compressed or bi-ridged or margined above, often with several ascending, about equal branches from near base. *P. compressus.*

Shrubs or half shrubs, the stems ligneous at least below the flowering portions; leaves mostly or all 2 (1.5) cm. long or longer.

Leaves mostly or all 2–4 cm. long or shorter; stems and virgate branches about equally slender; styles bifid or parted.

Leaves acute to acuminate both ends or at least apically.

Flowers in axillary clusters; anther chinks oblique or horizontal.

Leaves oblong-obovate, mostly or all about three times longer than wide.....*P. Pavonianus.*

Leaves ovate, mostly or about twice longer than wide (species critical, concomitance and constancy of characters unproved).

Styles appressed-recurved; ovary glabrous, smooth; glands of male flowers 3; leaves subglabrous, acumination marked.....*P. Mexiae, P. acuminatus.*

Styles usually rather more diffuse; glands of male flowers 6, more or less connate; leaves acute or scarcely acuminate.

Ovary papillose; connective free; leaves pubescent, obscurely acuminate.....*P. brasiliensis.*

Ovary glabrous; connective connate below; leaves often pubescent in Peru, acute.*P. pseudo-conami.*

Flowers (female) in axillary racemes; anther chinks vertical. *P. racemigerus.*

Leaves rounded both ends, oval or oblong-elliptic.

Calyx segments entire except in *P. rubellus.*

Leaves orbicular-elliptic, membranous; pedicels, at least of female flowers, elongate.

Leaves about 2 cm. long; pedicels several..*P. graveolens.*

Leaves about 3 cm. long; pedicels (female) solitary. *P. anisolobus.*

Leaves oblong-elliptic, coriaceous; female flowers 2–3 on pedicels 2 mm. long.....*P. rubellus.*

Calyx segments lacerate-fimbriate.....*P. lacerilobus.*

Leaves mostly or all about 7 cm. long or longer when grown; styles entire, little connate, in *P. Poeppigianus* or connate in *P. grandifolius.*

Leaves rotund or broadly elliptic, rounded or little narrowed to the obtuse tip.....*P. huallagensis.*

Leaves oblong-elliptic, suboblong or ovate, more or less narrowed to the usually acute tip.

Leaves nearly oblong, rounded, truncate or subcordulate at base, often about four times longer than wide; ovary 3-celled; stamens usually 6–9.

Branchlets and leaves beneath, at least prominent nerves, puberulent; stigmas stiped; seeds costulate. *P. salviaefolius.*

Branchlets as leaves typically glabrous or essentially; stigmas sessile; seeds smooth..... *P. grandifolius.*

Leaves various but not suboblong, usually acute at base and about three times longer than wide; stamens 2–4.

Male flowers clustered along short often leafless branchlets; calyx segments 4 or 6; ovary (known) 4–5-celled; styles bifid.

Male calyx segments 6; leaves lustrous above, subcoriaceous..... *P. Vincentae.*

Male calyx segments 4; leaves opaque or subopaque, subchartaceous..... *P. nobilis.*

Male flower clusters all axillary; calyx 5-parted; ovary 3-celled; stamens and styles 3, the latter nearly free, entire..... *P. Poeppigianus.*

Phyllanthus acuminatus Vahl, Symb. Bot. 2: 95. 1791; 381.

Much-branched arborescent shrub, sometimes 7 meters high, the angulate branchlets lineately puberulent with hyaline trichomes, the flowering usually elongate, herbaceous; petioles 1–2 (4) mm. long; stipules linear-lanceolate; leaves ovate or oblong-ovate, acute at base, more or less acuminate, mucronate, membranous, often 3–4 cm. long, 1–2 cm. wide, glabrous unless midnerve and ciliate margins; flowers monoecious, the female few, the male in axillary clusters with linear-ovate scarious sometimes lobate bracts; male flowers on capillary pedicels about 2 mm. long, the glands 3 opposite the 3 outer sepals; stamens 3, the filaments connate, anthers spreading; female pedicels 5 mm. long, elongating to 15 in fruit, apically clavate; outer sepals broadly ovate; disk glands 3, connate into irregular or subentire cup; ovary glabrous, smooth; styles free, bifid, short, appressed; capsules 3–4 mm. long, 3-sulcate, net-veined, the reddish-brown seeds carinate.—According to Boissier the herb. name *P. foetida* of Ruiz and Pavón is this plant. *P. Mexiae* Croizat, Journ. Wash. Acad. Sci. 33: 14. 1943, is similar but female disk glands are distinct. Compare Croizat for a discussion of this and related species, Caldasia 2: 129–131. 1943. Illustrated, Mart. Fl. Bras. 11, pt. 2: *pl. 7, fig. 2.*

Cajamarca: Prov. Jaén, *Raimondi* (det. Mansfeld).—San Martín: Tarapoto, (*Spruce 4928*).—Huánuco: Pozuzo, *Ruiz & Pavón* (det.

Boissier).—Junín: Chanchamayo, *Isern 2176*. South America; West Indies; Mexico.

Phyllanthus anisolobus M. Arg. in DC. Prodr. 15, pt. 2: 382. 1866.

Shrub, apparently entirely glabrous but fruits and male flowers unknown; slender lightly angled 10–13-leaved branchlets a dm. or two long; stipules triangular-lanceolate; leaves orbicular-elliptic, acutish at base, subrotund-mucronulate at tip, 3–3.5 cm. long (as known), 22–28 mm. wide, thin-membranous, finely reticulate-veined, paler beneath; female flowers solitary, the strict filiform pedicels enlarged toward apex, 8–12 mm. long; 3 outer calyx divisions elliptic-lanceolate, 2.5 mm. long, the inner 3 much broader, ovate, equally long, all paler on margins; hypogynous disk crenate, ovary smooth with shortly incurved bifid styles.—Thought by the author to be related to *P. micrandrus* M. Arg. of Venezuela with smaller leaves and calyces, but compare *P. graveolens*. F.M. Neg. 8498.

Peru: Without locality, *Pavón*, type, Herb. Boissier.

Phyllanthus brasiliensis (Aublet) Poir. Encycl. 5: 296. 1804; 383. *Conami brasiliensis* Aublet, Pl. Guian. 927. *pl. 354*. 1775. *P. Conami* Swartz, Prodr. 28. 1788.

Similar to *P. acuminatus* which probably should be drawn to be included as a variant but according to Croizat leaves ellipsoid, not manifestly acuminate, prevailingly pubescent, ovary papillose to armed with soft processes; styles effuse, long; disk under the ovary prevailingly of discrete glands, the male glands connate.

San Martín: Tarapoto, *Spruce 3961* (det. Mueller). Pongo de Cainarachi, *Ule 6408*.—Cuzco: Valle de Urubamba, 1,600 meters, (*Herrera 3621*). To northern South America.

Phyllanthus compressus HBK. Nov. Gen. & Sp. 2: 109. 1817; 390.

Erect annual, or more enduring and the stem ligneous below, often bushy above to about 3 dm. high, completely glabrous; younger branches strongly compressed; stipules cordate at base, produced below on one side; leaves subsessile, oblong-elliptic or -obovate, acute or obtuse at base, obtuse or rounded at apex, mostly 6–14 mm. long, 3–4 (5) mm. wide, opaque, distinctly nerved; flowers monoecious on very short pedicels or subsessile; fruiting calyx about 2 mm. broad, disk glands urceolately connate, in male flowers free; ovary

smooth; styles slender, bilobed, reflexed; seeds brown, lineately scabrous.—In the similar *P. hyssopifolioides* HBK. known from Brazil the seeds are smooth, merely foveolate, flowers 1–3 in the axils, leaves 6–7 mm. long, 3–3.5 mm. wide, the nerves faint. Standley has given an herbarium name to *Mexia 6154* without any indication of distinctive characters; as there are already several names for similar plants a critical study of them all seems advisable.

San Martín: Near Tarapoto, *Spruce 4173* (det. Mueller).—Loreto: River bank at mouth of the Santiago, *Mexia 6154?* Central America; southern Mexico.

Phyllanthus fluitans Benth. ex M. Arg. Linnaea 32: 36. 1863; 400.

Small floating species simulating in habit and form of leaves the water fern *Salvinia;* stems 3–5 cm. long; rootlets many; stipules acuminate, 2 mm. long; leaves sessile, cordate-orbicular, slightly emarginate, about 12 mm. wide, pellucid-punctate; flowers 2–4 in the axils, nearly 1.5 mm. long, shortly pedicellate, calyx segments suborbicular, filaments and glands of the male free, the latter in female flowers urceolately connate; styles bifid, the branches suberect; capsules depressed-globose, nearly 3 mm. wide, the seeds smooth dorsally.

Loreto: Floating near shore of Isla Cacao, Río Amazon, Ramón Castilla, *F. J. Hermann 11314.5.* Brazil.

Phyllanthus grandifolius L. Sp. Pl. 981. 1753; 329.

A tall shrub or small tree with elongate spreading-drooping branches, the compressed angulate branchlets more or less puberulent as often the leaves beneath, at least within Peru; stipules ovate, reflexing, about a third as long as the 4–7 mm. long petioles; leaves ovate-lanceolate or oblongish, obtuse or subobtuse at base, acuminate or obtusish, 7–15 cm. long, 3–5 cm. wide or also half the size and proportionately broader; fascicles 2–12-flowered, commonly with 1 terminal female flower, the pedicels finally about equaling the petioles; disk in both sexes elongate-urceolate; male calyces accrescent, becoming 3–4 mm. long; stamens usually 6; filaments connate; style column stout, the sessile stigmas subpetaloid; ovary 3-celled; capsules depressed, deeply sulcate, glabrous, 8 mm. long, 12 mm. broad; seeds 5–6 mm. long, smooth.—A variant with hirtellous- or tomentellous-papillose leaves beneath, var. *cornifolius* (HBK.) M. Arg., type from Guayaquil, may rather be *P. salviae-*

folius; the Ruiz and Pavón specimen so determined by Mueller was probably, if the same, from that locality. Determinations mostly by Mansfeld. There may be some question as to the correct application of the name.

San Martín: Rumisapa near Tarapoto, *Williams 6768.*—Loreto: Lower Río Huallaga, *Williams 4831.* Puerto Arturo, *Williams 5190.* Fortaleza, *Williams 4220.* Santa Rosa, *Williams 4880.* To Mexico, Brazil, Guianas and the West Indies. "Gallinazo-panga" (Williams).

Phyllanthus graveolens HBK. Nov. Gen. & Sp. 2: 112. 1817; 383.

Shrub with slender lutescent-puberulent branchlets; stipules linear-lanceolate, submembranous; leaves orbicular-ovate or broadly elliptic, rounded-acutish at base, rounded-obtuse, sometimes minutely mucronulate at tip, 12–20 mm. long, 10–15 mm. wide, thin-membranous, glabrous or very sparsely puberulent both sides; flowers all monoecious, the few female with the male, or often lacking, the pedicels shorter than the leaves, usually 4 together, the former glabrous, the latter scabrous; male calyx segments broadly obovate, thick connate glands papillose, anthers connate; ovary glabrous and smooth; styles rather effuse.—*P. Millei* Standley of Ecuador is similar but leaves as to type somewhat smaller and puberulent as those of *P. pseudo-conami.* F.M. Neg. 5027.

Tumbez: Near Tumbez, *Weberbauer 7644.*—Cajamarca: Tomependa, Bracamora, *Bonpland,* type.

Phyllanthus huallagensis Standl. ex Croizat, Journ. Wash. Acad. Sci. 33: 13. 1943.

Glabrous tree, older bark much lenticellated and fissured; stipules triangular, small; petioles stout, 2–3 mm. long; leaves rotund-elliptic, rounded both ends or very shortly and obtusely acuminate, on vigorous branches 9–12 cm. long, about 7.5 cm. wide, on branchlets about 6 cm. long, 4 cm. wide, chartaceous, the 6–8 slender lateral nerves prominent beneath, the reticulate venation moderately so; inflorescence to 2.5 dm. long, axillary and subterminal, the slender racemes with many clustered male flowers on filiform pedicels (to 10 mm. long) from a pulvinate base, the accompanying female flowers few; male flowers 4 mm. wide, lobes 6, 2 mm. long, alternating 6 glands, stamens 3, connate into a column 1 mm. long; female flowers 5–6 mm. wide on pedicels 3.5 mm. long, the 6 glands curved and almost connate beneath the globose ovary;

styles 3, short, reflexed except at tip.—Section *Elutanthos* Croizat, l.c. 12, otherwise Mexican and Central American and typified by *P. glaucescens* HBK., distinctive by virtue of pulvinate bases together with delicate male flowers.

San Martín: Juanjuí, *Klug 4240*, type.

Phyllanthus lacerilobus Croizat, Caldasia 3: 21. 1944.

Shrub, sparsely and shortly lax-pubescent; stipules 3, lateral 2 broadly triangular, 1.5–2 mm. long, central more slender; flowering branches to 15 cm. long with 10–12 puberulent leaves each side, gray-olive, elliptic, rounded or barely narrowed at tip or truncate-retuse and mucronate, somewhat oblique to rounded base, (1–)2 cm. long, (5–)10 mm. wide, the slender veins about 4 pairs; petioles very short; stipels setaceous; flowers solitary in axils of the uppermost leaves, commonly 3–5 and sometimes also in several of the axils toward the branchlet bases; male perianth 5 mm. wide, the 4 (5) lobes 2 mm. long, 1.5 mm. wide, marginally lacerate-fimbriate; pedicels to 7 mm. long; stamens 4, coalescent into column; glands 4 (5), contiguous, margin lobate; female perianth 8 mm. wide, the 6 ovate laciniate lobes 3 mm. long, 2 mm. wide, disk glands 6, plicate; ovary glabrous, styles 6, 0.75 mm. long; pedicels apically compressed, 6–7 mm. long.—Section *Eriococcus* M. Arg. 420, fide author. Common as this appears to be in the vicinity of Iquitos it is strange if an earlier name does not exist; cf. *P. rubellus*.

Loreto: Caballo-Cocha, *Williams 2378*, type. Pebas, *Williams 1928*. Iquitos, *Williams 7896*. Mishuyacu near Iquitos, *Klug 2567* (n. sp. Standley, in herb.). "Arbol de Navidad."

Phyllanthus lathyroides HBK. Nov. Gen. & Sp. 2: 110. 1817; 403. *P. filiformis* Pavón ex Baillon, Adansonia 1: 29. 1860, fide M. Arg.

Erect more or less lignescent slender annual (?) sometimes several dm. high and more or less branched, the branches slender or filiform, terete, or slightly compressed, glabrous; stipules linear-lanceolate; petioles 0.5–1 mm. long; leaves distichous, oblong or oblong-elliptic, obliquely subcordate at base, commonly rounded-obtuse and apiculate at apex, 6–14 mm. long, 2.5–4 (6) mm. wide, pale green, glaucescent and with 4–5 or 6 pairs of rather conspicuous nerves beneath; flowers monoecious, the solitary or geminate male on slender pedicels about 2(–5) mm. long, sepals broadly ovate, subobtuse, disk glands free, papillose; stamens 3, connate below; female pedicels 4–5 mm.

long in fruit, sepals oblong-obovate, venose, disk connate, undulate; ovary smooth, the 3 styles bifid; capsules 2.5–3 mm. in diameter, the seeds densely scabrous with many longitudinal rows of minute points.—The type of *P. filiformis* was collected by Tafalla near Guayaquil. The similar and also widely distributed *P. Urinaria* L. is distinguishable by the minutely ciliolate leaves and the minutely tuberculate ovary, the seeds transversely rugose. *P. carolinensis* Walt. has somewhat obovate cuneate-based leaves and usually one flower of each sex subsessile in their axils; found as near as Galapagos where ligneous below. F.M. Neg. 29353 (*P. filiformis*).

Cajamarca: Nanchó, Cascas and Cutervo, *Raimondi.*—Ayacucho: Ccarrapa, wooded hillside, *Killip & Smith 22438.*—Loreto: La Victoria on the Amazon, *Williams 2729.* Yurimaguas, *Poeppig 1655* (det. Mueller). Tropical America to Mexico and the West Indies. "Piedra con piedra" (Williams), "orilla del riachuelo" (Raimondi).

Phyllanthus Mexiae Croizat, Journ. Wash. Acad. Sci. 33: 14. 1943.

Apparently much like *P. acuminatus* and possibly supplanting that in Peru; male flowers to 2 mm. wide, glands 3 about base of the 3 connate stamens, pedicels 3–5 mm. long; female flowers about 7 mm. wide, pedicels to 10 mm. long, lobes 6, glands distinct, erect, incurved, more or less regular, styles short, reflexed.—Described as entirely glabrous but specimen seen pubescent as *P. acuminatus;* the author points out that true leaves may be present in some groups of *Phyllanthus;* here he regards them as transformed into stipules and the leaves, so-called, actually foliose bracts on the flowering axis.

The collector of the type found it used as a fish poison.

Peru: According to Croizat, Caldasia 2: 130. Ecuador. "Barbasco."

Phyllanthus Niruri L. Sp. Pl. 981. 1753; 406.

Much like *P. lathyroides;* stipules subulate from a broad scarious base; leaves rounded at both ends, 6–15 mm. long, 2–6 mm. wide, the lateral nerves inconspicuous; flowers solitary or one of each sex in the same axil; male sepals 5 or 6 as small disk glands, filaments connate; female pedicels in fruit only 1–2 mm. long, sepals 6, oblong, membranous; capsules 1.5–2 mm. in diameter, 3-sulcate; seeds with 5–6 faint longitudinal dorsal lines.—Like the related species this is

a common tropical weed. Determinations by Standley. The similar *P. diffusus* Klotzsch, 409, also widely distributed but always in wet places usually has stems basally thickened, smaller leaves, narrower stipules, female sepals and the seeds with many transverse lines in addition to the dorsal ones.

San Martín: Pongo de Cainarachi, *Klug 2767*. Tarapoto, *Williams 6051*. San Roque, *Williams 7124*.—Huánuco: *Ruiz & Pavón*.—Loreto: Yurimaguas, *Williams 4466; 5036*. Pastures and fields, Iquitos, *Williams 7929; Killip & Smith 26890*. Clearing, Río Putumayo, *Klug 1735*. Widely distributed in the tropics. "Chanca piedra" (Williams).

Phyllanthus nobilis (L. f.) M. Arg. in DC. Prodr. 15, pt. 2: 414. 1866. *Margaritaria nobilis* L. f. Suppl. 428. 1781 (excl. male pl.). *P. antillanus* (Juss.) M. Arg. Linnaea 32: 51. 1863. *Cicca antillana* Juss. Euphorb. Tent. *pl. 4, fig. 13B*. 1824.

A shrub or small tree sometimes 14 meters high; leaves subsessile, elliptic or lanceolate-elliptic, usually 6–13 (18) cm. long, 2.5–5 (7) cm. wide, subchartaceous, glabrous or sometimes puberulent beneath; flowers dioecious, greenish-white, the male fascicled along a 5–15 mm. long peduncle, their pedicels 3–5 mm. long, the female solitary or 2–4-nate in the axils, the thicker pedicels often 1–1.5 cm. long; both sexes with 4 roundish or elliptic sepals in 2 series and with annulate fleshy disk; male flowers with 4 free stamens; female with 4–5-celled ovary, 4–5 thick basally connate styles shortly 2-cleft; capsules about 13 mm. long and thick, at first somewhat fleshy; seeds usually 4, complanate, trigonous, smooth, olive-green, 3 mm. long.—Not clearly distinct even as variants are *P. nobilis* var. *peruvianus* M. Arg., leaves cuspidate-acuminate, fruiting pedicels little longer than the mostly 5-celled capsules, and var. *Pavonianus* (Baill.) M. Arg., similar but capsules mostly 4-celled, styles deeply biparted. Wheeler, Contr. Gray Herb. 124: 35. 1939, employs the name of Jussieu on the ground that that of Linnaeus filius was based on a mixture.

Fruit eaten by Indians, said to be bluish when mature (Mexia).

San Martín: Tarapoto, *Spruce 4472* (var. *peruvianus*). Juanjuí, *Klug 3812* (det. Standley). Pongo de Cainarachi, *Klug 2686; 2695* (n. sp. in herb., Standley). Without locality, *Ruiz & Pavón* (var. *Pavonianus*).—Loreto: Florida, *Klug 2013?; 2338*. Río Santiago above Pongo de Manseriche, *Mexia 6140; 6296* (det. Standley); *Tessmann 3978*. Puerto Arturo, *Williams 5145*. Mouth

of Río Blanco, *Tessmann 3046* (det. Mansfeld). Middle Ucayali, *Tessmann 3270* (det. Mansfeld).—Río Acre: *Krukoff 5663* (det. Croizat with query). Tropical South America to Mexico and the West Indies. "Loronaue," "antachibuca" (both Indian, Mexia), "ucariviro" (Tessmann).

Phyllanthus orbiculatus Rich. Act. Soc. Hist. Nat. Paris 1: 113. 1792; 401. *Orbicularia orbiculata* (HBK.) Moldenke, Rev. Sudam. Bot. 6: 178. 1940.

Clearly annual, erect, with usually many always very slender branches, these sometimes branched, several to 10 cm. long; stipules triangular, acute; petioles 1–2 mm. long; leaves about rotund, usually around 5 mm. wide, sometimes twice as large, rather truncate at base, often mucronulate, glaucous beneath, membranous, the lateral nerves 3–4; pedicels axillary, 1–2 in the axils, nearly filiform or the female slightly clavate, 2 mm. long, or the fruiting to 6 mm. long; sepals 6, oblong or the narrower female acute; stamens 3, nearly free, the 6 crenate disk glands free; ovary 6-sulcate, styles 3, bifid; capsules about 2.5 mm. wide, compressed, the trigonous seeds longitudinally punctate-scabrous in rows, 1.5 mm. long.

Piura: Shaded rocks, slope of Loma Prieto (*Haught & Svenson 11631*, det. Svenson as affine).—Junín: Sandy shady river bank, La Merced, *5396* (det. Johnston); *Killip & Smith 23768*. Chanchamayo Valley, *Schunke 617; 618* (det. Standley).—Cuzco: In open weedy growth near river, Echarate, *Goodspeed Exped. 10472* (det. Standley). Brazil; Guianas; Venezuela.

Phyllanthus Pavonianus Baillon, Adansonia 1: 30. 1860; 380. *P. oxycladus* M. Arg. Linnaea 32: 26. 1863, fide M. Arg.

Branches subterete but the branchlets acutely and regularly 6 wing-angled, 2 angles from the petioles, 4 from the stipules, these lanceolate, not auriculate, scarious-margined; leaves distichous, oblong-obovate, acute both ends or apically obtusish, 1.5–2 cm. long, 4–9 mm. wide, ochraceous puncticulate beneath; flowers monoecious, both sexes fascicled in axils, the male 2–5 on pedicels 3–4 mm. long, the female 1–2 on pedicels 5–8 mm. long; calyces 1–2 mm. long, fruiting not at all accrescent; disk urceolate in both sexes, distinctly crenate or lobed, that of the male flowers soon unevenly 3-parted; stamen column entire, short, stout; ovary smooth, glabrous, the biparted styles spreading; capsules nearly 3 mm. in diameter.—A Ruiz and Pavón collection at Madrid was labeled as from Guayaquil

and was made by Tafalla. Apparently comparable or similar is *P. Haughtii* Croizat, Caldasia 3: 22. 1944, with pedicels of male flowers only 2 mm. long, the 3 disk glands separate. F.M. Neg. 24586.

Peru (perhaps, cf. note above). Ecuador.

Phyllanthus Poeppigianus M. Arg. in DC. Prodr. 15, pt. 2: 323. 1866. *Glochidion Poeppigianum* M. Arg. Linnaea 32: 71. 1863.

Glabrous, to about 2 meters high, the firm somewhat spreading branchlets slender; stipules rigid, linear-lanceolate, deciduous; petioles stout, 4–6 mm. long; leaves oblong-ovate or ovate-lanceolate, rounded-obtuse or lightly cordate at base, often long-acuminate to obtuse tip, 6–11 cm. long, usually 3.5–4.5 cm. wide; flowers dioecious, minutely racemulose or fasciculate, calyx 5-parted, lobes of male oblong-ovate; disk present in both sexes; male pedicels capillary, flexuose, little longer than petioles, the female firmer, shorter; style column slender, the 3 linear divisions spreading; stamens 3, filaments monadelphous, anthers finally transversely dehiscent.—Was found by Martius, together with *P. Martii* M. Arg. in Mart. Fl. Bras. 11, pt. 2: 27. *pl. 5.* 1873, as near Peru as Japura, Brazil, and therefore is to be expected; *P. Martii* is similar but leaves only 4.5–7 cm. long, 2–3 cm. wide, sepals all equal, flowers all distinctly racemulose. Here might key *P. guyanensis* (Aublet) M. Arg., 376, the leaves often acute at base, flowers of both sexes many, on axillary pulvinae, styles biparted; the species is to be expected. F.M. Neg. 5038.

Peru (probably). Brazil.

Phyllanthus pseudo-conami M. Arg. in Mart. Fl. Bras. 11, pt. 2: 43. 1873. *P. pseudo-conami* M. Arg. var. *pubescens* M. Arg., l.c.

Tall much-branched shrub, the slender branchlets, petioles (about 1 mm. long), and short female pedicels puberulent in the Peruvian type; leaves oblong-ovate or subelliptic, rounded at base, obtusely short-acuminate, about 2 cm. long, 8–10 mm. wide, glabrous or essentially, olive-green; flowers several in the leaf-axils, the flexuose capillary male pedicels 5–7 mm. long; glands of the male flowers annulate, anthers free; ovary smooth, glabrous; styles bifid, diffuse; capsules 5 mm. broad, 3.5 mm. long, thus markedly depressed, deeply sulcate.—The variety *glaber* M. Arg. from the upper Amazon is completely glabrous with gradually acuminate leaves 2.5–4 cm. long;

capsules unknown and will probably prove to be distinct. Author wrote name with hyphen. F.M. Neg. 6595.

San Martín: Tarapoto, *Poeppig*, type. Brazil?

Phyllanthus racemigerus M. Arg. Linnaea 32: 23. 1863; 375.

A tall glabrous shrub with angulate branchlets about 2 mm. thick, at base clothed with 25–30 distichous ascending leaves, and racemulose dioecious flowers borne at their early leafless tips; stipules ovate-lanceolate; petioles 2–2.5 mm. long; leaves ovate or oblong-ovate, both ends acuminate, 2.5–4 cm. long, 1–2 cm. wide, subcoriaceous, eglandular, glaucescent beneath; racemes of female flowers finally often 2 cm. long, rather densely bracted, suberect; male flowers unknown but stamens probably 3; calyx 2 mm. long, coriaceous, the segments broadly ovate; urceolus entire; ovary subpruinose, glabrous.—The similar *P. adenophyllus* M. Arg., 376, of northern Brazil, has terete branchlets, leaves glandular spotted beneath below the apex, 1.5–2.5 cm. long, 8–15 mm. wide, and likewise probably will be found in Amazonian Peru; *P. racemigerus* has been collected as near as Solimões. Illustrated, Mart. Fl. Bras. 11, pt. 2. *pl. 7. fig. 1.*

Peru (probably). Amazonian Brazil.

Phyllanthus rubellus M. Arg. in DC. Prodr. 15, pt. 2: 379. 1866.

Glabrous, the subflexuous terete branches palely lenticellate, the branchlets purplish-brown; stipules small, nearly scarious; petioles 2–3 mm. long; leaves oblong- or lanceolate-elliptic or oblong-ovate, obtuse both ends, 3–5 cm. long, 1.5–2.5 cm. wide, green above, reddish-glaucous beneath, reticulate-veined; female flowers in axils, geminate or ternate, their pedicels about 2 mm. long, the ovate lacerate unequal calyx segments deciduous; urceolate disk crenulate; styles rigid, semiconnate, bifid, the lobes refracted; capsules globose, smooth, glabrous, mature not known.—*P. symphoricarpoides* HBK., 324, of Colombia and Ecuador, would key here except for the 3-parted styles which ally it to *P. Poeppigianus;* it is distinctive by the combination of leaves obtuse at both ends, 2 cm. long, about half as wide, and racemulose flowers. F.M. Neg. 8497.

Peru(?): Without locality, *Ruiz & Pavón*, type.

Phyllanthus salviaefolius HBK. Nov. Gen. & Sp. 2: 116. *pls. 107, 108.* 1817; 330.

Allied to *P. grandifolius* but the shortly connate styles slender, the stigmas only 1 mm. dilated at tip, glands of the male flowers finally free and seeds costulate; branchlets and often leaves puberulent tomentose; stipules foliaceous, subequaling the petioles; fascicles sessile or shortly peduncled, many-flowered, the male pedicels about 7 mm. long, capillaceous, the elongating female suberect, rigid, filiform, both sexes glabrous as the similar calyces, the former 2, the latter 5 mm. long; male nectaries truncate, foveolate-rugose; capsules 5 mm. long, 6 mm. broad; seeds finely costulate.—Outer 1–3 stamens sometimes distinct and branches often nearly all male or nearly all female. The Peruvian plant is var. *glabrescens* M. Arg., leaves glabrous above, scabrous on nerves beneath. Illustrated, HBK. l.c. and Baillon, Etude Gen. Euphorb. *pl. 24, figs. 15–19.*

Huánuco: Pink-flowered shrub in rocks by river, Mito, *3278* (det. Mansfeld). Without locality, *Ruiz & Pavón.* To Colombia and Venezuela.

Phyllanthus Vincentae Macbr., nom. nov. *Xylosma minutiflorum* Macbr. Candollea 5: 392. 1934 not *P. minutiflorus* F. Muell., 1865–66.

Shrub with glabrous or glabrate slender more or less flexuose branchlets; petioles 1.5 mm. long; leaves ovate-lanceolate or ovate, unequally rounded at base, gradually narrowed to the obtusish tip, finally to 1 dm. long, 3.5 cm. wide, usually smaller, glabrous, chartaceous-membranous, entire, drying darker above; fascicles sessile; pedicels glabrous, filiform, to 7 mm. long, somewhat contorted at least in age; calyx segments 6, scarcely 0.75 mm. long; stamens 6.—In this work, Field Mus. Bot. 13. pt. 4, 1: 31. 1941, I noted that this plant is evidently from fruiting material of the same collection in herb. Delessert, Geneva, a species of *Phyllanthus*, probably *P. guianensis* Aublet or affine. It appears to be near *P. nobilis* however and if distinct it may well bear the name of the well-known botanical bibliographer, Miss Edith Vincent, who with her usual care discerned that my original name was preoccupied in *Phyllanthus.*

Loreto: Puerto Arturo, Yurimaguas, *Williams 4970*, type.

4. **SECURINEGA** Comm. or Juss.?

Similar to *Phyllanthus* but flowers always clustered or solitary in the axils, sepals always 5, coriaceous or firm, rudimentary ovary more or less obvious, styles usually 3, the divisions recurving.

Securinega congesta M. Arg. in Mart. Fl. Bras. 11, pt. 2: 76. 1873; 379. *Phyllanthus congestus* M. Arg. Linnaea 32: 25. 1863.

Glabrous tree or tall shrub, the branches terete, the branchlets more or less angled; stipules linear-lanceolate, about 1 cm. long; petioles 2–3 mm. long; leaves ovate-lanceolate, base acute, shortly cuspidate-acuminate, 6–12 cm. long, 1.5–4 cm. wide, firm-membranous, paler beneath; flowers in axillary glomerules, 1–7-flowered, the basal male with 5 short stamens, subcylindric ovary rudiment, the female calyx dark brown, subcoriaceous, about 4 mm. long, disk urceolate, lobulate; capsules dark-colored, 7 mm. broad, 5 mm. long or larger, usually only 1–2 developing, sometimes 3.—*S. elliptica* (HBK.) M. Arg. of Ecuador may be known at once by its elliptic apically rounded leaves. Illustrated, Mart. Fl. Bras. *pl. 11, fig. 1.* F.M. Neg. 21577.

Loreto: Caballo-Cocha, *Williams 2234; 2470.* La Victoria, *Williams 2943* (det. Mansfeld). Iquitos, *Williams 8044; 8121* (det. Mansfeld). Río Marañón near mouth of Río Tigre, *Killip & Smith 27524* (det. Standley). Near Mazán, *Mexia 6542* (det. Standley). Río Itaya, *Williams 82.* Florida, *Klug 2274* (det. Standley). To the Guianas. "Puinayma Jipi-ey" (Klug, Huitoto).

5. RICHERIA Vahl

Reference: Pax & Hoffm., Pflanzenreich IV. 147. xv: 26–30. 1922.

Trees with alternate petioled pinnately nerved leaves and dioecious apetalous flowers, the male glomerulate in axillary or lateral interrupted spikes or racemes, the dense female racemes shorter. Sepals free or connate, 3–5, imbricate. Male flowers with disk glands free between the 3–6 distinct stamens, the anthers oblong; ovary rudiment small. Female flowers with annulate disk; ovary 3-celled; styles short, stout, broad, entire or slightly lobed. Ovules in cells geminate. Capsules separating into bivalved cocci.—Dedicated to Richer de Belleval, 1564–1632, French horticulturist.

Leaves coriaceous, the male flowers sessile..... *R. grandis.*
Leaves membranous, the male flowers pedunculate.
R. submembranacea.

Richeria grandis Vahl, Eclog. Amer. 1: 30. *pl. 4.* 1796; 27. *Amanoa divaricata* Poeppig in Poepp. & Endl. Nov. Gen. & Sp. 3:

22. *pl. 226*. 1845. *Guarania ramiflora* Wedd. ex Baillon, Etude Gen. Euphorb. 598. 1858.

Glabrous or essentially except for sepals, disk and young ovary; branchlets angled, pruinose, the leaves apically crowded; petioles to 3 cm. long, canaliculate; leaves oblongish or variously obovate, narrowed to acute or subobtuse base, usually rounded-obtuse, rarely somewhat acuminate, ordinarily a dm. or two long and about half as wide, entire, coriaceous, in Peru often 2–4-glandular above near base (typically broadly obovate and eglandular or obscurely so), paler and irregularly reticulate beneath, with 6–8 nerves; inflorescences solitary or several, the male 3–10 cm. long, the 3–7-flowered glomerules sessile, the female 3–5 cm. long, racemose, these flowers shortly pedicelled; bracts about 1 mm. long, often denticulate; male sepals 3–4, unequal, half as long as the filaments, the anthers introrse; female sepals 5, ovate, acute, 1.5–2 mm. long; capsules subovoid, about 1 cm. long, smooth.—Named variants of doubtful value include vars. *divaricata* (Poeppig) M. Arg., leaves obovate-lanceolate, acuminate or acute, eglandular, and *latifolia* Pax & Hoffm., leaves broadly obovate, rounded, 2–4-glandular at base. F.M. Negs. 5015 (var. *divaricata*); 32540 (var. *latifolia*).

Huánuco: Cuchero, *Poeppig* (type, var. *latifolia*); *Poeppig 1441* (type, var. *divaricata*). To southern Brazil and the West Indies.

Richeria submembranacea Steyermark, Field Mus. Bot. 17: 419. 1938.

Glabrous unless for the minutely strigillose petioles, these 5–12 mm. long, and the hirtellous inflorescences; leaves obovate-elliptic, acute at base, abruptly caudate, 7.5–11.5 cm. long, 3.5–5.5 cm. wide, entire, concolor, membranous or submembranous, with 6–8 pairs of nerves; male racemes slender, 9–11 cm. long, densely fuscous hirtellous, the shortly peduncled flowers 15 mm. broad, with 5 broadly ovate obtuse sepals slightly hirtellous without; stamens 5, the anthers introrse; female flowers unknown.—Differs from all other species in its submembranous leaves, from *R. grandis* further by its pedunculate male flowers and from *R. laurifolia* Baillon of Upper Amazon by its entire abruptly caudate leaves (Steyermark). Since the type was from São Paulo de Olivença, a region which has many plants known to occur within Peru, this species also is to be expected.

Peru (compare note above). Amazonian Brazil.

6. ANDRACHNE L.

Reference: Pax & Hoffm., Pflanzenreich IV. 147. xv: 178. 1922.

Low, annual or scarcely suffrutescent (Peru), with small bistipulate leaves, the monoecious petaliferous flowers 1–3 in their axils. Male flowers with 5 imbricate sepals, same number of shorter petals, free disk glands and stamens (Peru) the erect anthers with parallel cells; ovary rudiment small. Female flowers with 5 sepals but small or minute petals, disk glands sometimes connate, ovary 3-celled, the bifid styles with capitulate stigmas; ovules geminate. Capsules separating into cocci with triquetrous ecarunculate seeds.—The name was an ancient one for *Portulaca oleracea.*

Leaves glabrous or pulverulent, 5–7 mm. long.....*A. microphylla.*
Leaves glandular-ciliate, about 1 cm. long.....*A. ciliato-glandulosa.*

Andrachne ciliato-glandulosa (Millsp.) Croizat, Journ. Wash. Acad. Sci. 33: 11. 1943. *Phyllanthus ciliato-glandulosus* Millsp. Proc. Calif. Acad. ser. 2. 2: 219. 1889.

Annual, spreading from filiform root, densely glandular ciliate except the oldest leaves, these sparsely so; stems terete, somewhat irregularly branched; petioles one-third as long as leaves, the latter mostly ovate, obtuse or emarginate, 1.5 cm. long, 1 cm. wide or many much smaller, even minute; stipules orbicular, entire; inflorescence axillary, more or less geminate, the flowers pedicellate; male calyx with ovate acute lobes and five stiped glands opposite the clefts; stamens 5, filaments free; female flowers larger, the lanceolate obtuse hyaline-margined calyx lobes with 5 alternating cylindric glands at base; styles cleft to middle or free, the stigma slightly recurved; ovary globose, ciliate glandular as the depressed capsule; seeds pale brown, finely pitted, each pit with a scale.—After Millspaugh. Stems often 1–1.5 dm. long. So closely resembles *A. microphylla* as to be very easily confused with it; both belong to section *Phyllanthidea* with a minute pistillode in the female flower and both allied to *A. aspera* Spreng. from the Punjab to Morocco; all undoubtedly pre-Tertiary species (Croizat). The determination has been accepted without critical examination.

Lima: Ambar to Huacho, *Stork 11471* (det. Johnston). Lower California.

Andrachne microphylla (Lam.) Baillon, Etude Gen. Euphorb. 577. 1858; 178. *Croton microphyllus* Lam. Encycl. 2: 212. 1786.

Somewhat glandular, finely and intricately branched; petioles about as long as the leaves, these elliptic or ovate, obtuse both ends, 5–7 mm. long, 2–5 mm. wide, glabrous, or in type sparsely pulverulent, opaque, lucid-green; flowers solitary, geminate or ternate on capillary pedicels about 1 mm. long or sometimes on a very short peduncle, the female pedicels firmer, reflexed in fruit and glandular-hirtellous as the branchlets and petioles; male sepals hyaline, oblong-ovate (the female ovate-lanceolate, opaque, hyaline-margined), about as long as the rhombic-obovate petals, these much shorter than sepals in female flower, liguliform; stamens free as the stipitate urceolate disk glands; disk entire, membranous; styles nearly free; capsules glandular-hirtellous, 3.5 mm. broad.—A much-branched annual(?) with incurved branches forming a subglobular mass, 1–6 dm. high; detached from the weak root it becomes a "tumbleweed" (Haught).

Huánuco: Near Huánuco, *Dombey*, type.—Piura: Talara, east of La Brea, *Haught 39* (det. Croizat).—Lima: Viscas, along Río Chillon, 1,800 meters, *Pennell 14492* (det. Croizat).

7. HYERONIMA Fr. Allem.

Reference: Pax & Hoffm., Pflanzenreich IV. 147. xv: 31–40. 1922.

Shrubs or trees marked (in Peru) by the lepidote indument especially on the leaves beneath, these pinnately nerved, the nerves arcuately ascending and joined before the entire margins. Flowers dioecious, apetalous, often paniculate, shortly pedicelled, or subsessile, the bracts minute, the male inflorescences the larger. Male calyx somewhat campanulate with 5 more or less connate disk glands, 3–6 free stamens, the pendulous anthers exserted, the connective enlarged. Ovary rudiment small. Female disk entire or lobulate; ovary 2(–nearly 3)-celled, the short styles bifid, reflexed; ovules geminate. Fruit drupaceous with 1 ecarunculate seed.—Genus named for Jeronimo Serpa, Brazilian horticulturist, and written by the author *Hyeronima* or *Hieronima;* Walpers' change to *Hieronyma* has been generally followed but the author's first choice should be retained as by Lanjouw. The type species, *H. alchorneoides* Fr. Allem., the "uricana" or "urucurana" of Brazil, is the source of a fine wood said to be much sought for furniture.

The following key is after Pax and Hoffmann but from the little material seen it seems possible that the degree of pubescence as a

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character for the distinguishing of species may prove to be unreliable; the number of species may therefore actually be fewer than these authors indicated.

Leaves densely lepidote beneath, the scales more or less overlapping.
- Leaves oblong, ovate or obovate, rarely elliptic, about half as wide as long, scarcely if at all scabrous.
  - Leaf nerves pilose beneath; fruit 3–5 mm. long. *H. Moritziana.*
  - Leaf nerves not pilose beneath; fruit (known) about 1 cm. long.
    - Leaves rigid, obtuse..... *H. macrocarpa.*
    - Leaves membranous, acute..... *H. andina.*
- Leaves broadly elliptic, more or less scabrous, often nearly as wide as long.
  - Leaves flexible; rachis branches even below slender or about 2 mm. thick..... *H. alchorneoides.*
  - Leaves rigid; rachis branches to 4 mm. thick.... *H. peruviana.*

Leaves closely to sparsely lepidote beneath but the scales not overlapping.
- Scales evenly distributed on leaves beneath, approximate; nerves not at all pilose.
  - Leaves rigid, obtuse..... *H. macrocarpa.*
  - Leaves membranous, acute..... *H. andina.*
- Scales scattered on leaves beneath; nerves more or less pilose.
  - Leaves oblong or oblong-obovate..... *H. oblonga.*
  - Leaves rotund-elliptic..... *H. laxiflora.*

Hyeronima alchorneoides Fr. Allem. Diss. c. icon. in Trab. Vell. Rio Jan. 1848; 36.

Stout branchlets, petioles (2–6 cm. long), leaves beneath and calyces densely lepidote; stipules deciduous, only the upper present, but conspicuous, petiolate, nearly a cm. long; leaves broadly elliptic, sometimes suborbicular, often 1–2.5 dm. long, 0.5–1.5 dm. wide or even larger, abruptly acute or very shortly apiculate, rounded at base or slightly contracted to petiole, membranous or subcoriaceous, scattered punctulate-lepidote and slightly scabrous above, glabrate or somewhat pilose on the nerves, the 7–10 secondary as the veins prominent beneath; panicles erect-spreading, the male to 1.5 dm. long, the female much shorter; bracts small, broadly ovate, acute or obtuse; pedicels to 2 mm. long; calyx of both sexes poculiform,

3–5-dentate, pubescent within as without, male disk entire, shorter than calyx, pilosulous, the thicker female pilose-margined; rudimentary ovary obovate-truncate, pilose; ovary lepidote; fruit ovoid-globose, 4–5 mm. long, sparsely lepidote.—Becoming a fine timber tree, the heartwood red, the sapwood reddish brown when first cut.

Huánuco: Shapajilla, 630 meters, *Woytkowski 30* (det. Standley). —Loreto: Mouth of the Santiago, *Tessmann 4114* (det. Mansfeld). Gamitanacocha, Río Mazán, *José Schunke 330* (det. Standley).—Río Acre: Mouth of the Río Macauhán, *Krukoff 5640* (det. Steyermark). To Pará and southern Brazil. "Uricana," "urucurana," "palo de sangre."

Hyeronima andina Pax & Hoffm. Pflanzenreich IV. 147. xv: 37. 1922.

In general resembles *H. macrocarpa* especially in pubescence, but petioles 2–4 cm. long, leaves elliptic, acute or subacute at base, cuspidate, 13–20 cm. long, 6–9.5 cm. wide, membranous; male panicles 8–14 cm. long, laxly few-branched, bracts 1 mm. long, acute, pedicels 2–3 mm. long, male calyx 3–5-dentate, disk glands little shorter than calyx, pubescent as rudimentary ovary; female panicles 4–5 cm. long, pedicels 1 mm. long, calyx 5-dentate, longer than entire pubescent disk; ovary sparsely lepidote or subglabrous; fruit probably small (authors).—F.M. Neg. 5010.

Peru (probably). Colombia to Bolivia.

Hyeronima laxiflora (Tul.) M. Arg. Linnaea 34: 66. 1865; 39. *Stilaginella laxiflora* Tul. Ann. Sci. Nat. sér. 3. 15: 244. 1851.

Branchlets not at all stout, densely lepidote as the petioles, these rather slender, 4–7 (12) cm. long, and spreading panicles, the male 12–18 cm. long, the female much shorter; stipules oblong-ovate, the petioles nearly as long as the cochleate 3–10 mm. long blade; leaves rotund-elliptic, cuspidate-acuminate at the rounded apex, obtuse or shortly acute at base, 1–2 dm. long, usually 7–15 cm. wide, membranous or subcoriaceous, laxly reticulate-veined, early scattered and sparsely lepidote both sides, more or less brownish pilose beneath on the nerves, these ordinarily about 7, rarely 10; lower bracts simulating stipules, acute, floriferous, small; pedicels rigid, 1.5 mm. long or shorter; male calyx minutely 3–5-dentate, subequaled by the entire rufous-pilose disk, rudimentary ovary elongate, pilose; female calyx minutely denticulate, ovary sparsely lepidote; fruit little compressed, 4.5 mm. long.—Crooked trunks with distinct root insertions

or very heavy spurs to a high level (Lanjouw). To 25 meters tall, the wood very hard. F.M. Negs. 19494, 24358.

Peru: Without locality, (*Martius 2647*, in part, fide Pax & Hoffmann). To the Guianas; Colombia?

Hyeronima macrocarpa M. Arg. amend. Pax & Hoffm. Pflanzenreich IV. 147. xv: 34. 1922. *H. macrocarpa* M. Arg. var. *Spruceana* M. Arg. Linnaea 34: 66. 1865.

Pubescence entirely lepidote, the younger parts densely, the leaves permanently so beneath; petioles 1.5–2 cm. long, acutely canaliculate above; leaves obovate, rounded-obtuse or emarginate, 5–7 cm. long, 3.5–4.5 cm. wide, rigid, prominently reticulate-veined, glabrous above; female racemes panicled, bracts at least 1 mm. long, broadly ovate; pedicels stout, angled, in fruit to 4 mm. long; female calyx obconic, minutely if at all 5-denticulate, disk entire; immature fruits at least 1 cm. long, 5 mm. broad above the middle, narrowly compressed pyriform, acuminate, glabrous.—Perhaps should include *H. andina* and then probably within Peru. F.M. Neg. 7037 (var. *Spruceana*).

Peru (compare note above). Ecuador.

Hyeronima Moritziana (M. Arg.) Pax & Hoffm. Pflanzenreich IV. 147. xv: 33. 1922. *H. macrocarpa* M. Arg. var. *Moritziana* M. Arg. Linnaea 34: 66. 1865.

Angled branchlets, petioles, these 1.5–2 cm. long and leaves beneath densely lepidote, the former becoming glabrescent; leaves oblong-elliptic or obovate, obtuse, emarginate or acute, obtuse or acute at base, 4–11 cm. long, 2–4.5 cm. wide, chartaceous, the 6 or 7 nerves pilose beneath, the venation there reticulate; stipules lanceolate, cochleate, 5–7 mm. long; panicles to 8 cm. long in fruit, lepidote as the 0.5–1 mm. long bracts; male calyces shortly dentate, lepidote disk divided into 5 cuneiform lobes, the subglabrous rudimentary ovary included; female calyces 4–5-dentate, not at all exceeded by disk; fruits glabrous or subglabrous, ovoid or pyriform, 3–5 mm. long.—The typical form, var. *Fendleri* (Briq.) Pax & Hoffm., has slender petioles, leaves 4–7 cm. long; var. *yungasensis* Pax & Hoffm., petioles stouter, leaves to 10 cm. long, nerves pilose but finally glabrescent; as fruit is unknown this may not pertain to *H. Moritziana* (Pax & Hoffm.). F.M. Neg. 5014 (var. *Fendleri*).

Peru (probably, especially if the Bolivian variety belongs here). Venezuela; Bolivia?

Hyeronima oblonga (Tul.) M. Arg. Linnaea 34: 66. 1865; 37. *Stilaginella oblonga* Tul. Ann. Sci. Nat. sér. 3. 15: 248. 1851.

Branchlets terete, densely lepidote as the petioles, these slender, 1–3 cm. long; stipules cochleate, about 6 mm. long; leaves early sparsely and scattered lepidote, more or less pilose beneath on the 5–7 prominent nerves (veins reticulate) or finally glabrescent, membranous, lustrous or rarely opaque, varying in shape but often somewhat obovate and lanceolate to oblong, ordinarily 7–15 cm. long, about half as wide; panicles 3–10 cm. long, often branched to base, the male longer, the female shorter and more simple, all lepidote including the calyces; pedicels of former 1 mm. long; bracts ovate, acute; calyces 5-dentate, thick disk glands of the male as cylindric rudimentary ovary and cupulate entire female disk tomentulose; ovary glabrous; fruit about 5 mm. long, ellipsoid, acute both ends.—F.M. Neg. 24359.

San Martín: Zepelacio near Moyobamba, *Klug 3588* (det. Standley).—Loreto: Mouth of Río Santiago, *Tessmann 4165* (det. Mansfeld). Balsapuerto, *Klug 3113* (det. Standley). Mexico to Bolivia and southern Brazil.

Hyeronima peruviana Pax & Hoffm. Pflanzenreich IV. 147. xv: 37. 1922.

Densely lepidote except the leaves above and the older branchlets; stipules ovate, acute, contracted at base, 1–2 cm. long; petioles 2–5 cm. long; leaves broadly elliptic or obovate-elliptic, acute at base, very shortly and acutely acuminate, 10–14 cm. long, 6–9 cm. wide, rigid coriaceous, punctate with scattered lepidote indument but scarcely scaberulous above, the 7–9 nerves with the veins prominent beneath; panicles robust, the male 10–15 cm. long, the female 4–5, the small broadly ovate bracts acute, the flowers subsessile; male calyx poculiform, 5-dentate, pubescent, the firm dilated disk pilosulous and marginally undulate-crenate; ovary rudiment subcylindric, pilose; female calyx cupulate, lightly denticulate, the hypogynous disk ciliate, the ovary densely lepidote.—Noted to attain 15 meters. Allied to *H. alchorneoides* of eastern Brazil but differs sufficiently in the rigid coriaceous leaves, robust inflorescence, the rachis 3–4 mm. thick, the subsessile male flowers and character of disk (authors). The Ecuadorean related species *H. asperifolia* Pax & Hoffm. has leaf nerves pilose beneath while *H. macrocarpa* (M. Arg.) Pax & Hoffm. is said to differ in its obovate leaves, rounded-obtuse or emarginate and only 5–7 cm. long, 3.5–4.5 cm. wide, disk

entire, glabrous; there are other closely related species to be expected, maybe distinguishable by their membranous asperous leaves.

Huánuco: Huamalíes above Monzón, open woods, 900 meters, *Weberbauer 3447;* 285. Chinchao, *Weberbauer 6822.*—Junín: West of Huacapistana, in shrubs, 2,700 meters, *Weberbauer 2185,* type.

8. **DRYPETES** Vahl

Reference: Monachino, Phytologia 3: 32–35. 1948.

Trees or shrubs with alternate entire or sometimes serrulate coriaceous pinnate-nerved leaves, minute or rarely foliaceous caducous stipules and apetalous dioecious flowers fasciculate in the leaf axils or on the older wood. Calyx in both sexes with 4–5 (6–7) often coriaceous or fleshy sepals, the male with central disk, and sometimes with glandular ring, 3–12 free stamens opposite sepals, rudimentary ovary variously developed, large, scale-like, none or obscure, the female with annulate or cupulate disk, 1–2(–4)-celled ovary, sessile or subsessile stigmas, geminate ovules. Fruit drupaceous, scarcely or slightly fleshy, indehiscent, with 1 or 2 ecarunculate seeds.—Similar or confused genera include *Discocarpus* Klotzsch, Pflanzenreich IV. 147. xv: 203, and *Chonocentrum* Pierre, l.c. 205, the former with petaliferous male flowers with annulate lobed disk, styles developed, fruit subglobose, capsular, the latter with apetalous flowers, male with urceolate disk, large rudimentary ovary, female unknown; this is *C. cyathophorum* (M. Arg.) Pierre, originally included in *Drypetes;* as to *Discocarpus, D. Spruceanus* M. Arg. and *D. brasiliensis* Klotzsch perhaps are most likely to be found within Peru, the former with subequal calyx and petals, pedicellate smooth capsules, the latter with subsessile female flowers (male unknown), muricate capsules.

Drypetes amazonica Steyerm. Field Mus. Bot. 17: 420. 1938; 35.

Glabrous except the inflorescence; stipules not observed; petioles 4–10 mm. long; leaves elliptic, entire, typically 12–24 cm. long, 3–7 cm. wide, gradually acuminate; male flowers 7–many on slender pedicels 3–4 mm. long; sepals 4, subrotund, sparsely strigillose without and marginally ciliolate, 2.6–2.9 mm. long, 2.1–2.3 mm. wide; stamens 8–10, the obvious central disk obscurely puberulent (fide Monachino); rudimentary ovary none; female flowers 1–3 with 5 rounded sepals 3–3.5 mm. long, 2.2 mm. wide, pilosulous without;

fruits pyriform, tomentose, to 1.7 cm. long (immature).—*D. variabilis* Uitt. of the Guianas has 1–3 flowers, 4–8 stamens with glabrous anthers; the Peruvian material according to Monachino belongs with these two species but their precise position "is dubious"; their specific validity as indicated by Standley in herb. seems to be too questionable to give him as authority so for the convenience of this work they may be disposed of as *D. amazonica* var. **peruviana** Macbr., var. nov., foliis oblongo-ellipticis vel late ellipticis, 10–15 cm. longis, 4–7.5 cm. latis, subabrupte breviterque acuminatis; floribus masculis numerosis, pedicellis 5–10 mm. longis; sepalis suboblongis, circa 2.2 mm. longis, 1.5 mm. latis; staminibus paullo inaequalibus. Probably *Krukoff 5624* belongs to the variety but Monachino observes that it has 8–11 stamens. The Peruvian plants do not seem to have the anthers at quite the same level and in this respect suggest the pubescent branched *D. Spruceana* M. Arg. of Brazil in which species they are obviously at two levels, and, moreover, glandular-ringed at base, the rudimentary ovary large. In the other Brazilian species with gland-ringed stamens, *D. Krukovii* Monach. l.c. 34, the anthers are at the same level and the rudimentary ovary consists of three scales. A tree 5–11 meters high.

San Martín: Juanjuí, *Klug 3869* (type, var. *peruviana*); also *3880*.—Río Acre: *Krukoff 5624*. Brazil.

9. CROTON L.

Julocroton Mart. Flora 20, Beibl. 2: 119. 1837.

Reference: Mueller, Argoviensi, in DC. Prodr. 15, pt. 2: 513–700. 1866.

Herbaceous or ligneous, usually lepidote or stellate pubescent, the leaves mostly alternate and often biglandular at base or tip of petiole, seldom lobate or pinnate-nerved, the spicate or racemose flowers commonly monoecious, the male usually disposed above the female, these sometimes petaliferous, solitary under each small bract or sometimes with 2–3 male which are ordinarily petaliferous with 5 perianth segments, 5–many stamens, erect at anthesis. Female perianth 3–5-lobed, sometimes irregularly. Ovary 3(2–4)-celled, the styles 1–many times parted; ovules solitary; capsule separating into 3 bivalved cocci; seeds smooth carunculate.—*Julocroton*, defined only by the unequal female sepals, sometimes glandular or appendaged, is an arbitrary segregation, as the character occurs elsewhere and in Peru even in *Croton* proper, since *C. Boissieri*

and *C. tarapotensis* have unequal calyx segments; and Croizat, Rev. Arg. Agron. 10: 144. 1943, cites *C. leucophyllus* Torr. of Texas as a species with irregularly lobed perianth segments but accepts *Julocroton* as it differs materially according to him from *Croton* in the sum of characters that distinguish it. There are many examples in taxonomy to support his argument but it fails to carry weight unless the "sum of characters" is consistently developed; here it does not seem to be.

Since there is no modern revision of this large genus, many of the species based on Peruvian plants, whether restricted to type or interpreted according to tradition, may prove to be the same or variants of others from adjacent areas; it seems possible too that many of the local forms given names recently and by former students are the result of introgressive hybridization and apomixis; under these circumstances the following key at best is only suggestive.

C. Lorentzii M. Arg. Goett. Abh. 19: 96. 1874 was reported by Bruns from Cachendo, Arequipa (*Guenther & Buchtien 249*). The species has been omitted since the determination is highly uncertain.

Annuals, weedy, herbaceous or the stems sometimes hard but then very slender.

Leaves deeply lobed.....*C. lobatus.*

Leaves dentate.

Leaves obtuse both ends or merely acutish; stem indument often spreading at least in part.....*C. glandulosus.*

Leaves ovate-acute or -acuminate; stem indument appressed. *C. trinitatis.*

Ligneous plants and clearly shrubs or trees.

Leaves (mature) small, 1–2 (2.5) cm. wide (a small state of *C. Ruizianus* might be sought here).

Leaves rhombic-ovate, acuminate, about 2 cm. wide, lepidote. *C. adipatus.*

Leaves rotund, barely apiculate (see also *C. balsameus*). *C. nitidulifolius.*

Leaves ovate-lanceolate or narrower, lepidote or stellate.

Leaves acute both ends, closely lepidote; stamens about 20. *C. Boissieri.*

Leaves rounded or subacute at base; stamens about 10.

Leaves narrowly ovate, 1.5–2.5 cm. long.

Female pedicels 1 mm. long; styles glabrous.
C. rubiginosus.

Female pedicels to 3 mm. long; styles tomentulose.
C. andinus.

Leaves lanceolate, to 4 cm. long; female pedicels elongate.
C. pedicellatus.

Leaves distinctly larger, at least many broader.

Indument predominantly stellate, sometimes minute, scurfy or lepidote-stellulate, sometimes nearly lacking, rarely simple (see p. 63).

Leaves ovate to rotund, rarely oblongish, and the petioles often shorter than 3 cm.

Leaves not acuminate or in any case mostly or all narrowed well above the middle, never acutely acuminate from about the middle or caudate.

Leaves rhombic-ovate, softly stellate-tomentose above.
C. thurifer.

Leaves various, rarely rotund, often soon glabrate or, if stellate, asperous rather than tomentose above.

Leaves at least mostly somewhat emarginate, glabrate above.

Leaves orbicular-ovate, glandular at base.
C. balsameus.

Leaves broadly ovate, distinctly or somewhat longer than wide, eglandular.....*C. heliotropiifolius.*

Leaves usually more or less acute, sometimes rounded, rarely shortly acuminate.

Leaves acute or subrounded to openly cordulate at base, submembranous, smooth and glabrate above; stamens 15–25.

Leaves obtuse or apiculate; glands usually 2, sessile or subsessile or lacking.
C. rivinaefolius, C. alnifolius.

Leaves shortly acute-acuminate; glands 2–4, stiped.
C. spurcus.

Leaves usually minutely cordulate, often coriaceous, somewhat scabrous and rugose above.

Stamens at least typically 30–40; leaves often subrotund.....*C. Ruizianus.*

Stamens at least typically 15–22; leaves often ovate.

Leaves pinnate-nerved, entire; filaments pubescent only below.....*C. collinus.*

Leaves 5–7-plinerved, crenate-denticulate; filaments hirtellous.....*C. pycnanthus.*

Leaves acutely acuminate and narrowed from about the middle, or, if above, caudate-acuminate as in *C. Pilgeri.*

Leaves 3–5-plinerved from base, eglandular, often about 10 cm. long.

Calyx lobes entire; leaves membranous, green above. *C. scaber.*

Calyx lobes (female) lacerate; leaves firm, cinereous above.....*C. flavispicatus.*

Leaves 3–7-plinerved, coriaceous, biglandular, often 4–8 cm. long.....*C. Baillonianus.*

Leaves pinnate-nerved to glandular base.

Leaves subabruptly acuminate, bicolored, with 2 sessile glands.....*C. Pilgeri.*

Leaves subconcolored with 2–4 stiped glands. *C. spurcus, C. churumayensis.*

Leaves oblongish or ovate-rotund but the petioles soon mostly or all even on flowering branchlets 3–many cm. long.

Leaves ovate-rotund, never oblongish, always cordate or at least broadest at base except *C. fragrantulus* (see p. 62).

Petioles 3(2)–4 cm. long or rarely half as long as the usually medium-sized leaves, the often dense pubescence ferrugineous, not or scarcely barbate.

Inflorescence paniculiform; lax or scandent shrub; leaves ovate but acutish at base...*C. fragrantulus.*

Inflorescence spiciform or strobiliform; leaves rounded to cordate at base.

Female calyx lobes equal, entire; stamens 15–many; inflorescence spiciform; leaves glandular.

Basal glands 2, sessile or shortly stiped.

Leaves obtuse to acute or not clearly acuminate, often submembranous, the subpinnate

nerves usually obscurely impressed; stamens in type 30–40.....*C. Ruizianus.*

Leaves typically narrowed from middle, acuminate, 3–5-nerved at base, nerves prominent above; stamens ex char. 15–32 (apparently there is a membranous-leaved state).
C. Baillonianus.

Basal leaf glands 4(2)–several, conspicuously stiped.....*C. pungens, C. quadrisetosus.*

Female calyx lobes deeply dentate, unequal; stamens about 10; inflorescence strobiliform; leaves eglandular.

Petioles early 3–4 cm. long; disk entire.
C. triqueter.

Petioles mostly 2–3 cm. long; disk acutely lobed.
C. flavispicatus.

Petioles soon elongate, all unless the uppermost 5–many cm. long, the leaves usually ample (or the uppermost petioles shorter but subbarbate) unless in *C. palanostigma.*

Pubescence of branchlet tips and petioles subbarbate; basal leaf-glands stiped or indument in part reddish-fulvous; leaves greenish-brown (cf. *C. Tyndaridum*); species doubtfully distinct.

Glands stiped, 2 or more, conspicuous (cf. *C. pungens*).

Leaves closely tomentose-stellate beneath, shallowly or openly cordate.
C. callicarpaefolius, C. quadrisetosus.

Leaves rather openly hispidulous-stellate beneath, deeply and narrowly cordate.*C. perspeciosus.*

Glands sessile or minute and nearly hidden in tomentum.

Leaves distinctly longer than wide, acuminate.

Leaves asperous above with rather sparse lepidote-stellulate indument.
C. Rehderianus.

Leaves coarsely corrugate and softly stellulate above.....*C. bryophorus.*

Leaves ovate-rotund, scarcely longer than wide, short-acuminate.....*C. Tyndaridum.*

Pubescence of branchlet tips and petioles short, appressed or not at all shaggy-barbate; glands depressed (cf. *C. Tyndaridum*); leaves usually drying dark, the indument beneath cinereous if present.

Flowers small, to about 3.5 mm. long.

Leaves ample, glabrate in age; seeds finely striate. *C. draconoides, C. Lechleri.*

Leaves cinereous beneath or if glabrate rarely 10 cm. long; seeds estriate, somewhat puncticulate-rugulose (or coarsely costate, known).

Leaves rounded or lightly cordate at base, subcaudate-acuminate.

Leaves densely stellate-villous beneath, 1–1.5 dm. long; capsules about 5 mm. long. *C. tarapotensis.*

Leaves lightly or scurfy-stellate beneath, 6–10 cm. long; capsules 3–4 mm. long.

Indument of leaves beneath scurfy. *C. xanthochylus.*

Indument of leaves beneath sparse, stellate. *C. peltophorus, C. erythrochilus.*

Leaves deeply cordate.....*C. Macbridei.*

Flowers about 5 mm. long, the female sepals somewhat accrescent; leaves greenish and glabrate both sides or cinereous beneath, ample. *C. huitotorum, C. palanostigma.*

Leaves oblongish, acuminate, or rarely, as in *C. perlongiflorus*, acute, rarely broadest at base.

Leaves soon glabrous both sides; glands slender-stiped. *C. olivaceus.*

Leaves more or less pubescent, at least beneath; glands obscure or sessile.

Indument of leaves above simple or mostly simple, lax. *C. peruvianus, C. stenosepalus.*

Indument of leaves above asperous-stellulate or obscure.

Leaves scattered scurfy or appressed-stellate beneath.....*C. sampatik.*

Leaves villous-stellate, at least on nerves beneath.

Sepals in fruit to 6 mm. long; leaves smooth above. *C. Astianus.*

Sepals not accrescent; leaves scabrous above.

Leaves subcuneate-rounded at base, tomentose beneath.....*C. sapiiflorus.*

Leaves cordulate at base, stellate-villous. *C. perlongiflorus.*

Indument predominantly lepidote; leaves green at least above; petioles often less than 2 cm. long.

Leaves eglandular at rounded or subacute base, sparsely lepidote above.....*C. glabellus.*

Leaves biglandular at cuneate or acute base.

Indument soon lacking above, usually silvery beneath; leaf nerves about 20 pairs.....*C. matourensis.*

Indument about equally sparse both sides; nerves about 15 pairs (above basal).....*C. Tessmannii, C. cuneatus.*

Croton adipatus HBK. Nov. Gen. & Sp. 2: 68. 1817; 552.

Branchlets dichotomously branched, acutely angled as the petioles, flowers, as leaves above, lepidote with small multiradiate trichomes, these medially lustrous, obtusely umbonate; petioles stout (stipules obsolete), carinate beneath, about 1 cm. long; leaves rhombic-ovate, subobtuse at minutely glandular or eglandular base, acuminate, entire, rigid but fragile, 3–4 cm. long, 2–2.5 cm. wide, 3-plinerved, the nerves prominent beneath, the scales there a little broader, paler and more lustrous; racemes stout, floriferous nearly to base, the rachis multiangled; bracts ovate, 1–3-flowered; male pedicels subequaling the lepidote calyx, this 2 mm. wide before open; stamens about 15; filaments glabrous.—Relationship unknown, the female flowers not seen. F.M. Neg. 5049.

Cajamarca: Tomependa, Prov. Jaén, Bracamoros, *Bonpland,* type. Near mouth of Río Chinchipe, *Weberbauer 6218* (det. Mansfeld). "Ullucina."

Croton alnifolius Lam. Encycl. 2: 205. 1786; 604.

Younger branchlets depressed stellate, finally sublepidote, angled; stipules minute; petioles 1–2 cm. long; leaves biglandular at base,

broadly obovate or elliptic, commonly rounded-obtuse, sometimes oblong-elliptic, 3–6 cm. long, 2.5–4.5 cm. wide, subentire, firm-membranous, the youngest fulvous tomentose both sides, early scattered stellate puberulent above, soon glabrate; secondary nerves parallel, the lower 4 approximate; racemes a dm. or two long, dense; bracts ovate-lanceolate, denticulate; female flowers few or lacking, often with about 10 rudimentary stamens, fruiting calyx not accrescent; male flowers at opening 3 mm. across, 5-parted, stamens 12–20, filaments pilose at base; ovary stellate-tomentose; capsules 7.5 mm. long, globose-ellipsoid, glabrescent; seeds 6 mm. long, smooth except finely costulate.—While the species is typically of lomas it appears to be the same when in rocks and river plains of the interior. Here might be sought *C. rhamnifolius* HBK., apparently in Bolivia, with some hispidity on branches, the petioles often only a few mm. long, the flowers pedicellate; cf. also *C. heliotropiifolius* HBK. The Stork specimen could be *C. rivinaefolius*, not clearly distinguishable. F.M. Neg. 5051.

Piura: Serrán, river alluvial plain, 100 meters, *Stork 11379.*—Lima: Cheuchín, *Ruiz & Pavón*, type; *Dombey; Martinet.* Lurín, low clumps on sandy lomas, *5934* (det. Johnston). Atocongo, clefts of limestone rocks, *Pennell 14755.* Santa Eulalia, 1,300 meters, among large rocks, *Goodspeed* (det. Croizat).—Arequipa: South of Mollendo, in nitrate dust on hard sand behind beach area, *Eyerdam 25178.* Prov. Cañete, hills of Asia, stony slopes, 500 meters, *Vargas 9312* (det. Johnston).—Apurímac: Quisapata, 2,420 meters, *Vargas 8912.*

Croton andinus M. Arg. Linnaea 34: 126. 1865; 639.

Much-branched little shrub similar to *C. pedicellatus;* leaves greener above, more ovate and subacute both ends, 1.5–2.5 cm. long, 4–8 mm. wide; racemes about 1.5 cm. long; pedicels equaling the calyx, the female nearly 3.5 mm. long, the male 1.5 mm. wide; lanceolate male petals long-ciliate only at base; filaments glabrous; style divisions tomentulose; capsules 4 mm. long.—Otherwise scarcely differs from the related species and is yet another case requiring the study of more material to determine the significance, if any, of the characters noted. Croizat, Darwiniana 5: 458. 1941, suggested that it has a common range within Peru with *C. pedicellatus.* F.M. Neg. 7071.

Peru (probably; cf. note above). Bolivia.

Croton Astianus Croizat, Journ. Arnold Arb. 21: 95. 1940.

Type from a 4 meter shrub, the tips sordidly yellow-tomentulose, the bark becoming suberosely fissured; stipules subsetaceous, entire, 1–1.5 cm. long; petioles to 3.5 cm. long; leaves elliptic or elliptic-lanceolate, cuneate-rounded at base, obvious glands none, 6–16 cm. long, 3–5 cm. wide, coriaceous, rugulose, yellowish-villous-tomentose beneath, marginally with a dense papillose-setose zone; veins impressed above, about 8 pairs, only the first pair subtriplinerved; racemes (cymes) mostly male, to 3 dm. long, globose male buds about 3 mm. broad, pedicels 5 mm. long; female flowers solitary, calyx 9 mm. long, 6 mm. wide, gray tomentose, the triangular-lanceolate acute lobes 6 mm. long, 2 mm. wide, glabrous within; ovary hispid, small, globular; styles bifid nearly to base, stout, black, canaliculate, to 5 mm. long.—The long-acuminate calyx lobes suggest some affinities with *C. speciosus* from Venezuela and with *C. caldensis* from Brazil but the vegetative characters are quite different and the female flower is smaller; developed male unknown (Croizat). Meritoriously named for Susanna Ast, student of the Annoniaceae of Indo-China.

Junín: Between Panti and Rocchac, 2,400 meters, valley of the Pariahuanca, *Weberbauer 6536*, type.

Croton Baillonianus M. Arg. Linnaea 34: 85. 1865; 536. *C. Baillonianus* M. Arg. var. *pachyphyllus* M. Arg. l.c.

Branchlets rather stout, terete, apically reddish floccose-tomentose, the leaves permanently so beneath, the younger typically pulverulent-floccose above finally sometimes glabrescent and punctic-ulate-scabrous, often 4–8 cm. long, 2.5–4.5 cm. wide (petioles as long or a third shorter), ovate or oblong-ovate, acuminate, (3) 5–7-plinerved, more or less obscurely biglandular at base, in type subcoriaceous; secondary nerves arcuate-ascending, prominent beneath; stipules small, subulate; racemes dense, often entirely male; bracts short-ovate, 1–3-flowered; male pedicels 4–6 mm. long, firm, spreading, reddish villous as the subdepressed-globose 3 mm. wide male flower, this with elliptic-ovate ciliate and basally lanate petals, 13–32 pilosulous filaments, densely whitish villous receptacle; ovary rufous tomentose, styles deeply biparted, the laciniae shortly bifid, bilobed or subentire.—Var. *submembranaceus* M. Arg. has the broadly ovate leaves reddish tomentose both sides, then above sparsely, underneath densely, stellate-puberulent, finally cinereous beneath. As interpreted here this probably includes *C. perlongiflorus*

(said to have smaller male flowers) as to Cuzco plants, and in turn *C. Baillonianus* is perhaps not specifically distinct from *C. ferrugineus* HBK. or *C. rivinaefolius* HBK. but its leaves are rather uniformly cordulate-ovate, coriaceous with impressed veins, short- or long-acuminate. There is also a great resemblance to *C. quadrisetosus* except for the lack of the long-stiped leaf-glands. F.M. Negs. 5056; 34019; 5057 (var.).

Huánuco: Near Pozuzo, *4806.*—Junín: Near Tarma, *Ruiz & Pavón,* type.—Cuzco: Ollantaytambo, *Cook & Gilbert 283.* Santa Ana, *Cook & Gilbert 1483; 1560; 1561; 1562* (leaves long-acuminate). San Miguel, *Cook & Gilbert 916.* Machu-Picchu, *West 6464* (det. Wheeler, *Julocroton triqueter*). Salapunco, *Vargas 8112.* "Cabra-cabra" (Cook & Gilbert).

Croton balsameus M. Arg. Linnaea 34: 107. 1865; 589.

Much-branched shrub, the short intricate nodulose branchlets densely leafy, the younger as all growing parts densely tomentose; stipules dentiform, subulate; petioles 2–4 times shorter than the leaves, these 1–6 cm. wide, often a little longer, orbicular-ovate, subemarginate or obtuse both ends, subentire, submembranous, minutely puberulent or glabrate above, 2–4-glandular at base, 3–7-plinerved; racemes equaling the leaves, densely few-flowered, bracts linear-lanceolate, female flowers 5–8 or often solitary; calyx segments oblong-ovate, subobtuse, the calyx in fruit 5–6 mm. long; ovary fulvous tomentose, styles biparted, the divisions a little broader above, sometimes 1-lobed; calyx at opening nearly 3 mm. wide, both sexes tomentose; male petals oblong-obovate, cuneate at base, long-barbate, the margins ciliate villous; stamens about 15, the filaments slightly scabrous; capsules ellipsoid, 8 mm. long, tomentose; seeds smooth.—A specimen from the Madrid collection does not conform to the description but could be *C. Ruizianus,* of which nevertheless it may be a part and probably should go to that or/and *C. collinus.*

Huánuco: Near Huánuco, (*Ruiz & Pavón,* type).

Croton Boissieri M. Arg. Linnaea 34: 138. 1865; 677.

Densely and mostly dichotomously branched small-leaved shrub, early conspicuously silvery with a close lepidote indument, this becoming more or less ferrugineous especially on the leaves beneath and slightly lanate; petioles often 2–3 mm. long; leaves lanceolate-ovate or ovate-lanceolate, acute at both ends, 2–2.5 cm. long, 8–15

mm. wide, denticulate, subcoriaceous, finally obscurely punctate by the central remains of the indument; racemes only 2–5-flowered; bracts setaceous-subulate; larger lance-ovate segments of the fruiting calyx 5 mm. long, the smaller narrower; male calyx 4 mm. long, the petals lanate at base, glabrous above; stamens about 20; filaments barbate at base; ovary lepidote as the shortly bifid styles, the lightly lepidote capsules 6 mm. long; seeds smooth.—Suggests some species from Argentina. F.M. Neg. 5060.

Peru: Without locality, *Ruiz & Pavón*, type.

Croton bryophorus Croizat, Journ. Arnold Arb. 21: 96. 1940.

Shrub or small tree, the branchlets tardily glabrescent, early almost barbate with the abundant indument; petioles 3–5 (10) cm. long with some minute glands hidden beneath the tomentum; leaves ovate-elliptic, incised-cordate at base, longish-acuminate or subcuspidate, 7–9 cm. long, 3.5–5 cm. wide, rigid-coriaceous, yellow-olivaceous and subscabrous, rather resinous-tubercled-corrugate above, more or less floccose-tomentose beneath, the 6–8 pairs of ascending quite pinnate nerves notably orange fasciculate-tomentose; racemes bisexual, the younger with the incurved setaceous entire 5 mm. long bracts, especially of the male flowers, catkin-like, hispid-lanulose, to 11 cm. long, 3–4 mm. thick; immature male flowers hispid, 1.5 mm. wide; female 7 mm. broad, lobes linear, acuminate, about 4 mm. long, disk glands interrupted; capsules glabrescent, subellipsoid-trigonous, 1 cm. long, 8 mm. broad; seeds lead-colored, coarsely rugulose-costate, 5 mm. long, 3 mm. broad.—Differs from *C. abutiloides* HBK., 533, of Ecuador in the peculiar texture of the leaves and in the comose catkin-like young cymes; probably related to the *C. Baillonianus* complex (Croizat).

Ayacucho: Wooded hillside, Carrapa, 2,800 meters, between Huanta and Río Apurímac, *Killip & Smith 22287*, type.

Croton callicarpaefolius Vahl in Geisel. Croton. Monogr. 27. 1807; 532. *C. abutiloides* HBK. Nov. Gen. & Sp. 2: 86. 1817, probably at least as to Peru. *C. coriaceus* HBK. l.c. 87?

Type incomplete; petioles 5–10 cm. long, about equaling the leaves, these shortly 5-plinerved, basally 2–6 stipitate glandular, coriaceous-membranous evoluting stellate-puberulent above or sometimes apparently sparsely villous, beneath densely subfloccose tomentose; stipules herbaceous, sublinear, elongate, few-dentate; bracts linear-lanceolate; racemes of specimen seen all male, open calyx

4–5 mm. broad; petals spathulate-lanceolate, rigidly lanate-ciliate (to glabrate?); stamens about 40 (30–45), filaments barbate at base.—To this has been referred material from Venezuela as var. *pubescens* M. Arg., 532, the leaves villous above, twice as large, ovary rufo-hirsute, styles biparted, the laciniae incised denticulate; capsules globose, the seeds biseriately rugulose-costate. Compare note under *C. quadrisetosus*, which is probably the same. *C. abutiloides* HBK. and *C. coriaceous* HBK., both of Ecuador, have setaceous or subulate sepals, the first having male petals subglabrous above, while those of the second species are cottony-lanate; both these forms seem to be very similar and Diels, Bibl. Bot. 116: 103. 1937, wrote: it is possible that *C. abutiloides* and Vahl's plant are the same species, but the leaves of the former are not entire; both the Raimondi specimens from Cajamarca were referred to it in herb. Dahlem. F.M. Neg. 7064 (Fendler).

Piura: Chalaco, *Raimondi* (det. Dahlem, *C. coriaceus*).—Cajamarca: Chota, *Raimondi*. Nanchó, *Raimondi*. Without data, *Jos. de Jussieu*, herb. Paris, type. Venezuela? Ecuador? "Tango grande" (Raimondi), "palo blanco."

Croton churumayensis Croizat, Darwiniana 6: 466. 1944.

Glabrate shrub or little tree; stipules fleshy, minute; petioles 1.5 cm. long; leaves ovate-lanceolate, basally subcordate or truncate, apically rather long-acuminate, 3.5–8 cm. long, 2–4.5 cm. wide, early crustaceous-lepidote scabrous, finally glabrate, the adult brown and subglabrous beneath, obscurely and irregularly repand-serrulate, ascending veins about 8 pairs, glands obscure or 2–4, tubulose; spikes for a long way female, these flowers subsessile, about 3 mm. broad, 2 mm. long, the 5 broadly triangular foliaceous costate lobes rather densely indumented, glabrescent within, entire, greenish, often apically glandular and with 5 glands alternating sepals; ovary stellate, about twice as long as calyx, styles biparted, 1.5 mm. long; capsules 3.5–4 mm. long, 3.5 mm. broad, the seeds about 3 mm. long, ellipsoid, nearly erugulose; male flowers 3–4 mm. broad, 2.5 mm. long, pedicels 2 mm. long, stamens 15, strongly hispid at base.—Approaches my *C. spurcus* but seeds never 5 mm. long, female calyx lobes larger, glands less obvious (Croizat).

Cuzco: Calca, 2,960 meters, *Vargas 706*. Urubamba, 2,900 meters, *Weberbauer 4917*.—Puno: Churumayo, *Soukup 501*, type.

Croton collinus HBK. Nov. Gen. & Sp. 2: 78. 1817; 611. *C. ferrugineus* HBK. var. *collinus* (HBK.) M. Arg. in DC. Prodr. 15,

pt. 2: 611. 1866. *C. peltoideus* HBK., l.c.? *C. ferrugineus* HBK. var. *peltoideus* (HBK.) M. Arg. l.c.

Branchlets typically with short appressed indument; petioles 8–10 mm. long or somewhat longer; leaves ovate, acute, rounded or often slightly peltate at base, 3–5 cm. long, about 3 cm. wide, subentire or undulate, green (typically) but densely stellulate above, fuscous tomentose beneath, the pinnate nerves there prominent; glands sessile, 4 (in type) or apparently often fewer, usually 2 or even obsolete or concealed; racemes rather short, male bracts 1–5-flowered, petals and 15–18(–20) filaments pubescent below; styles bifid.—As remarked by Mueller *C. peltoideus* HBK. seems scarcely to differ from the type, with somewhat hirsute-tomentose branchlets, acuminate leaves peltate, 1.5–3 cm. wide, petioles 12 mm. long, glands 4–6, stamens 20 or more. The species may well be a high-altitude form of *C. Baillonianus* and for that matter passes apparently, as observed by Croizat, into *C. rivinaefolius* or *C. Ruizianus;* but *C. ferrugineus* HBK. as to typical form, with somewhat longer petioles and long-acuminate leaves, seems to be confined to Colombia (Croizat, Caldasia 2: 427. 1944), but of course with as broad an interpretation as has been given *C. rivinaefolius* could include *C. collinus* as a variety. The young specimen from Huancavelica, apparently referable here, suggests *C. pellitus* HBK. of Ecuador, that however as to type with much smaller leaves. F.M. Neg. 5094.

Cajamarca: Chiclayo to Chota, 1,300–2,200 meters, *Weberbauer 4123;* 189. Near Cavico at the Río Chamaya, Jaén de Bracamoros, *Bonpland,* type. Querocotillo, Micuipampa and Montan, Bracamoros, (*Bonpland,* type, *C. peltoideus*).—Huancavelica: Río Huarpa, 2,300 meters, *Weberbauer 5669* (det. Croizat, cf. *C. ferrugineus,* var.).—Arequipa: Mejía, (*Guenther & Buchtien 245?,* det. Bruns, *C. ferrugineus*). "Mosquera" (Bonpland).

Croton cuneatus Klotzsch in Hook. Lond. Journ. Bot. 2: 49. 1843; 525.

Striate younger branchlets, petioles (1–2 cm. long) and rachis densely brown lepidote, this indument soon less dense on the oblong- or lanceolate-elliptic leaves, becoming sparse beneath, even glabrate above; leaves shortly cuneate at base or at least acute, cuspidate-acuminate or acute at tip, the upper below the elongate terminally clustered or solitary racemes often a dm. or two long, about 5–7 cm. wide but either smaller or larger, entire or in Peru somewhat serrate, and with a pair of patelliform glands at base; flowers densely fascicled

in axils of small oblongish bracts, the uppermost male, the remaining mixed; calyx lobes oblong-ovate, obtuse, the male 2–3 mm. long, lanate within, the longer female pubescent (buds globose), both lepidote without; male petals glabrous without, stamens 14–16, densely pubescent, anthers ovoid; female petals reduced, glandular, barbate, ovary lepidote, styles twice cleft; seeds flattened, blackish-brown.—Croizat has indicated an unpublished varietal name for the Peruvian material. The Tessmann tree was 6 meters tall. F.M. Neg. 5079.

Loreto: Río Napa near Mazán, *Mexia 6449; José Schunke 43* det. Mansfeld). Iquitos, *Tessmann 5127*. Río Itaya, *Williams 3300*. Caballo-Cocha, *Williams 2272; 2343*. Timbuchi, *Williams 983* (det. Standley). Florida, *Klug 2003; 2270* (glabrate, leaves more serrate). To Guianas. "Puma-sacha," "moena" (both Williams), "mamurico-ey" (Klug; Huitoto).

Croton draconoides M. Arg. Linnaea 34: 90. 1865; 545.

Branches and branchlets covered with depressed stellate trichomes or these nearly simple; stipules lanceolate-subulate, elongate, entire; petioles subequaling the broadly cordate-ovate acuminate leaves, these commonly 10–15 cm. long, 7–11 cm. wide, 5–7-plinerved, patellate-glandular at base, membranous, the younger depressed stellulate becoming puncticulate above, cinereous beneath; secondary nerves about 12 pairs; racemes very long, the bracts all fasciculately flowered; female calyx segments ovate; stamens 15–18, the filaments sparsely pubescent below; ovary stellate-tomentulose; styles biparted, slender.—Resembles, according to the author, the more northern *C. Draco* but lacks the tubercled-stellate trichomes. The type based on a Sellow specimen from Bahia, Brazil; to this the author referred two specimens from Peru which are cited here under the similar *C. Lechleri*. F.M. Neg. 5087.

Peru(?): Compare note above. Brazil.

Croton erythrochilus M. Arg. Linnaea 34: 93. 1865; 548.

Branchlets dichotomous or subverticillately branched, terete, the tips as all younger parts shortly stellate-pubescent, finally grayish-brown with a pulverulent tomentum; stipules subulate, small; petioles about half as long as the leaves, these 8–10 cm. long, often 4–5.5 cm. wide at the lower third, rounded or subtruncate at base, obtusely (or acutely?) caudate-acuminate, entire, at first densely, finally sparsely, appressed puberulent, biglandular at base,

with 12–17 pairs of nearly equally distant nerves; racemes elongate, the fruiting 12–30 cm. long, bracts ovate, fruiting pedicels equaling the calyces, their segments oblong-ovate, subobtuse, small, not at all accrescent; ovary stellate-tomentulose; styles biparted, divisions entire; capsules depressed globose, 3.75 mm. long, 5 mm. broad, subpulveraceous-tomentulose; seeds smooth or shallowly rugulose.—Male flowers unknown in type. In Weberbauer specimen stamens about 18, villous below, petals narrower than the slightly stellulate lanceolate sepals. A gummy resinous sap drips in profusion from incision made in branches (and in some other species) and this may be one of the Crotons noted from Pozuzo by Ruiz and Pavón the juice of which "some people gather in calabashes and sell later as true dragon's blood, and in truth its taste and astringent flavor make it worth using." F.M. Neg. 5090.

Tumbez: Near Hacienda La Choza, *Weberbauer 7688*.—Huánuco: Pozuzo (?, see note above), *Ruiz & Pavón*, type.—Junín: Huacapistana, *Killip & Smith 24145* (det. Killip, *C. pungens*).—Apurímac: Prov. Abancay, *Vargas 8967?*—Cuzco: Cardena, *Vargas 6128*. "Sangre de Drago."

Croton flavispicatus Rusby, Mem. N. Y. Bot. Gard. 7: 283. 1927. *Julocroton peruvianus* M. Arg. Linnaea 34: 142. 1865; 704, not *C. peruvianus* Briquet. *J. peruvianus* M. Arg. var. *flavispicatus* (Rusby) Croizat, Rev. Arg. Agron. 10: 136. 1943.

Branchlets subtrigonous early angled and densely fulvescent, with apically stellate trichomes; stipules subulate, 7 mm. long; petioles 2–4 cm. long; leaves lanceolate-ovate, cordulate or obtuse at base, long-acuminate, entire to crenulate, (7) 8–12 cm. long, (3.5) 3–8 cm. wide, stellate-asperulous above, stellate-tomentose beneath; spikes dense, 2.5–3 cm. long, the flowers sessile, the bracts linear-spathulate, acuminate, marginally lacerate above; anterior female calyx lobes ovate, lacerate-incised, 4.5 mm. long in fruit; male buds softly tricornute, disk acutely 3-lobed, glands truncate (male flowers); stamens lanate-fimbriate below; styles short, nearly free; seeds reticulate-rugose-asperous, 2.5 mm. long, 2 mm. thick.—According to Croizat the Bolivian plant of Rusby differs from *J. peruvianus* in the less dense more slender inflorescence. Differs from *C. triqueter* in the shorter petioles, bracts and styles and especially in the acute 3-lobed disk. F.M. Neg. 5209.

San Martín: Tarapoto, *Spruce 4290*, type; *Williams 5401; Ule 6410*. Zepelacio, *Klug 3436*. To Argentina. "Chivo mashan" (Williams).

Croton fragrantulus Croizat, Darwiniana 6: 466. 1944. *C. paniculatus* M. Arg. Linnaea 34: 87. 1865; 537, not Lamarck, 1768.

Lax, perhaps scandent, the upper branchlets somewhat angled, all the younger parts fulvous or reddish villous-tomentose with stellate trichomes, these becoming few on the leaves above; stipules setaceous, 5–8 mm. long, deciduous; petioles 2.5–4 cm. long, apically patellate-biglandular; leaves rhomboid-ovate, acute at base, acuminate, 8–12 cm. long or smaller, usually 4.5–5.5 cm. wide, pinnate-nerved, or shortly 3-plinerved, membranous, minutely serrulate, secondary nerves 9–13, the lower often approximate; inflorescence paniculiform, the branches racemiform, terminal, lax or often apex of racemes dense, either male or female, 5–8 cm. long; bracts setaceous-linear, 3–6 mm. long, flexuous, 1–3-flowered; female pedicels short, male equaling or exceeding the calyx, this 3 mm. broad before open, the disk glands fleshy; petals obovate; stamens about 13, filaments below as receptacle lanate; female calyx with ovate acute segments; ovary tomentose; styles deeply 4-cleft or -parted, the divisions entire.—*Vargas 3694* from Sisal, Cuzco, incomplete, seems possibly to be referable here or related. F.M. Neg. 5142.

Huánuco: Chacahuasi, *Ruiz & Pavón*, type.

Croton glabellus L. Sp. Pl. ed. 2. 1425. 1763; 517.

Suggests *C. matourensis* and *C. cuneatus* in Peru but lacks the lower basal glands; the leaves are usually less argenteous than those of the former but more densely so beneath than those of the latter, the axillary racemes slender, often branched; leaves variable in size, rarely acute at base, shortly acuminate; lateral nerves 8–12 pairs; pedicels often longer, male about 2 mm., female to 6 mm.; calyx lobes stellate-lepidote as the petals, the female persisting about the densely lepidote ovary; styles more or less bifid; capsules oblong-globose, lepidote and slightly tuberculate; seeds smooth.—The racemes are usually much shorter than the leaves, the female flowers few.

San Martín: Near Tarapoto, *Williams 6769* (det. Mansfeld). Juanjuí, *Klug 3774* (det. Standley). Chazuta, *Klug 4010* (det. Standley).—Loreto: Puerto Arturo, *Williams 5070* (det. Mansfeld). Yarina Cocha, *Tessmann 3388* (det. Mansfeld). To Mexico and the West Indies.

Croton glandulosus L. Syst. ed. 10. 1275. 1759; 683.

Shortly stellate-pilose herbaceous annual, usually branched and several dm. high; stipules setaceous; petioles about a cm. long or

sometimes longer; basal leaf glands 2, patellate; leaves usually ovate or oblong-ovate, rounded or somewhat truncate at base, obtuse or acute, crenate, often 3–5 cm. long, 3 cm. or so wide, rather paler beneath; racemes 1–4 cm. long, the flowers subsessile; male sepals 2 mm. long, petals little longer; stamens 10; female sepals unequal, 3 mm. long, accrescent, spathulate; ovary hirsute; styles nearly completely biparted; capsules more or less stellate-hirsute; seeds with small caruncle, minutely pitted, to 4 mm. long.—A variant by many treated as distinct is *C. hirtus* L'Hér. or var. *hirtus* (L'Hér.) M. Arg. (subsp. *hirtus* (L'Hér.) Croizat, Bull. Torrey Club 75: 401. 1948), the stems, particularly, yellow-hispid, glands stiped, leaves green both sides, seeds said to be only 2–3 mm. long, characters regarded as specific elsewhere in the genus, probably incorrectly, but accepted by me because of expediency.

Junín: La Merced, *5292* (det. Croizat; det. Johnston, *C. hirtus*). Río Pinedo north of La Merced, *Killip & Smith 23584* (det. Mansfeld). Chanchamayo, *Isern 2328* (var.).—Huánuco: Pozuzo, *Ruiz & Pavón* (det. Mansfeld).—Cuzco: Illapani, *Buës* (det. Standley). Warmer Americas.

Croton heliotropiifolius HBK. Nov. Gen. & Sp. 2: 83. 1817; 634.

Branchlets ashy stellate-tomentose, the leaves softly so beneath but sparsely stellate and green above; petioles to 2.5 cm. long; leaves ovate, rounded or lightly cordate at base, obtuse or subretuse, often retuse and mucronate, to 7.5 cm. long, 4 cm. wide, entire, reticulate-veined, the midnerve prominent beneath, membranous, eglandular; racemes 7–10 cm. long, the lanceolate-linear bracts and rachis hirsute, the flowers pedicellate; male calyx double, the teeth ovate; stamens 16–18; filaments villous at base; female calyx simple, the teeth linear, hirsute as the ovary; styles bifid; capsules subglobose; seeds smooth.—Not seen but the branchlets described by Mueller as in part hirtellous; the original description does not suggest this but if so the species seems to be distinct from *C. rhamnifolius* HBK. with some hispid indument, to which Mueller referred it as a variety; it seems probable that it is a variant of *C. alnifolius* with some of the leaves retuse. F.M. Neg. 5153.

Cajamarca: Chamaya and on the Río Chinchipe, Prov. Bracamoros, (*Bonpland*, type). Nanchó, *Raimondi* (det. Dahlem, *C. rhamnifolius*). "Tango Chico" (Raimondi).

Croton huitotorum Croizat, Caldasia 3: 9. 1944.

Resembles *C. palanostigma;* leaves seem to be smaller, the largest 12 cm. long, 10 cm. wide, the indument beneath less dense; female flowers differ in having the lobes within strongly hispid, style laciniae 10–12, slender, ovary hispid; male stamens shorter, 2.5–3 mm. long, the filaments not at all dilated at base.—It is intermediate to *C. palanostigma* and *C. Killipiana* Croizat of Colombia (Croizat); it seems reasonable to assume that these differences will be shown to be within the range of a single species-concept, and the material I have seen from Guiana and Venezuela suggests this; it is noteworthy that Standley referred the type to *C. palanostigma* without query.

Loreto: Florida, *Klug 2149*, type. "Bogoro-ey."

Croton Lechleri M. Arg. in DC. Prodr. 15, pt. 2: 545. 1866. *C. Draco* Schlecht. var. *cordatus* M. Arg. Linnaea 34: 90. 1865.

Comparable to and maybe not distinct from *C. draconoides;* stipules scarcely 2 mm. long, rigid, early dentiform, sublanceolate but neither subulate nor setaceous; petioles shorter than the leaves, these 12–20 cm. long, 5–14 cm. wide, the younger more or less vividly ferrugineous-tomentose both sides becoming glabrescent and stellate-puberulent; racemes lax, more than 3 dm. long; stamens about 15, filaments pilose below; capsules 3 mm. long, 4.5 mm. broad, depressed globose, tridymous.—The specific status of this and a number of forms proposed as distinct remains to be proved. The Spruce and Poeppig specimens included by Mueller in his *C. draconoides* are cited here following Croizat, Caldasia 3: 17. 1944, but it seems to me doubtful that *C. Lechleri* is distinct; the type was referred by Grisebach to *C. alnifolius.* Trunk of Tessmann tree 5 dm. in diameter. F.M. Negs. 5128 (Ruiz & Pavón); 5087 (Spruce).

San Martín: Tarapoto, *Spruce 5482.* Pongo de Cainarachi, *Klug 2675* (det. Croizat).—Huánuco: Chinchao, *Ruiz & Pavón* (det. Mansfeld).—Junín: Chanchamayo Valley, *Schunke 296; 493.*—Loreto: Yurimaguas, *Poeppig 1846.* Puerto Meléndez, *Tessmann 3908* (det. Mansfeld, *C. draconoides*). Above Pongo de Manseriche, *Mexia 6301* (det. Standley, *C. palanostigma*).—Cuzco: Quillabamba, *Vargas 7539.*—Puno: San Gován, *Lechler 2400,* type. Without locality, *Ruiz & Pavón.* "Sangre de drago," "palo delgrado" (Tessmann).

Croton lobatus L. Sp. Pl. 1005. 1753; 667. *C. riparius* HBK. Nov. Gen. & Sp. 2: 90. 1817, fide Kew Index.

A variable annual often several dm. high, branching, green but usually sparsely stellate-pubescent and with deeply 3(–5)-parted leaves, these on slender sometimes glandular petioles and commonly 3–5 cm. long, their oblanceolate lobes more or less acuminate; stipules subulate; racemes ordinarily lax; male flowers shortly pedicelled, glabrous, the sepals elliptic, the petals lanceolate; stamens 10–13; female flowers subsessile, a little glandular; ovary stellate and pilose, the sometimes 8 mm. large capsules often finally glabrate; seeds 5 mm. long.—A number of variants given recognition by Mueller; the plant of HBK. was said by the authors to differ in the leaves being stellate beneath.

Piura: Talara, *Haught 41*. Cerro Prieto, *Haught 36*. La Brea, (*Haught & Svenson 11632*).—Cajamarca: Chamaya, Bracamoros, *Bonpland*. Tomependa, (*Bonpland*, type, *C. riparius*).—San Martín: Tarapoto, *Williams 6682*. Widely spread as a weed from Mexico.

Croton Macbridei Croizat, Darwiniana 5: 465. 1944.

Shrub or little tree, the innovations early hispidulous; stipules minute; petioles 2–4 (6) cm. long; leaves exactly ovate-cordate, often long-acuminate or subcaudate, 6–11 cm. long, 3–5 cm. wide, tomentose both sides, the marginal trichomes subsimple as in *C. stenosepalus* but shorter and more delicate, veins 7–10 pairs, the first pair branched, glands 2, patelliform; spikes slender, to 2.5 dm. long; male flowers hispid-tomentulose, to 3 mm. large, stamens about 25, pedicels about 3 mm. long; female subsessile, under fruit scarcely 4 mm. broad, the 5 linear-lanceolate free entire lobes 1.5–2 mm. long; petals none, disk subentire, slender fruiting column hardly 3 mm. long; capsules 5 mm. long; seeds rounded-rugulose.—Affine *C. aequatoris* Croizat of Ecuador and *C. tarapotensis* M. Arg. but at variance in the soft indument and the exactly cordate leaves; the Ruiz specimen referred to *C. pungens* by Mueller could belong here (Croizat). A duplicate so labeled bears a marked resemblance to *C. peltophorus* (a distinct species) var. *cuzcoanus* Croizat. Certainly near *C. tarapotensis* but as to type itself leaves narrowly caudate and deeply cordate, easily variable characters.

Huánuco: Pampayacu, mouth of Río Chinchao, *5131*, type. Cuchero, *Poeppig 1351?* (young, but maybe this; scarcely *C. Ruizianus* var. *cordatus* as determined in herb.).

Croton matourensis Aublet, Pl. Guian. 2: 879. *pl. 338*. 1775; 550.

Trees beautifully marked (unless in variants) by the contrasting foliage tones, the oblong-elliptic or elliptic leaves green and glabrous above, usually conspicuously argenteous with a dense lepidote indument beneath, this extending to the terminal aggregate racemes, their flowers usually, except for a few apical ones, female; petioles 2–3 cm. long; leaves acute or rounded at base, shortly acuminate, usually 1–2 dm. long, 4.5–6 cm. wide, the 2 (1–4) basal glands depressed or shortly stiped, often also some glands above the base near and on the entire margins; racemes usually a dm. long or longer, in Peru apparently half as long, bracts lanceolate or narrower; male petals lanceolate-spathulate, villous as the 11 stamens; female sepals lanceolate, medially glabrous within, marginally villous with simple trichomes, lepidote without as the ovary; styles 3–4-parted at least above, the divisions entire or 2–3-parted; capsules 3–5 mm. broad, lepidote; seeds about 2 mm. long.—The Peruvian variant seems to be var. *Poeppigianus* M. Arg., the styles longer, connate. *Klug 3355* was given a herbarium name by Croizat and is aberrant in having a number of male flowers nearly to base of racemes but the material is scarcely adequate for possible segregation. Williams, Field Mus. Bot. 15: 272. 1936, noted trees about 30 meters high, common in the lower Huallaga, the wood used for general construction. F.M. Neg. 5133.

San Martín: Zepelacio near Moyobamba, *Klug 3355* (det. Standley).—Loreto: Yurimaguas, *Williams 4711* (det. Mansfeld). Fortaleza, *Klug 2794* (det. Croizat, var.). Yarina Cocha, *Tessmann 3471* (det. Mansfeld). To the Guianas. "Yurac-siprana" (Williams).

Croton nitidulifolius Croizat, Darwiniana 6: 465. 1944.

Innovations fuscous-orange; stipules obsolete; petioles 5 mm. long; leaves broadly ovate, rounded at base, very shortly acuminate-apiculate, 2–3 cm. long, quite as wide, rather thick, beneath suborange submetallic pubescent with shortly radiate stellate trichomes, above densely squamulose, the pinnate veins often impressed, about 6 pairs, dark posterior glands 2; spikes short; male flowers unknown; female subsessile, 3 mm. long, about 2 mm. wide, the erect broadly triangular lobes longer than the globose suborange-lepidote ovary; styles divided.—Indument of *C. adipatus* but differs in character of female flowers; differs from *C. balsameus* M. Arg. with similar flowers in the orange or suborange indument (Croizat); however as to type female flowers of *C. adipatus* unknown.

Cuzco: Ollantaytambo, 3,000 meters, *Cook & Gilbert 543*, type; *536*. "Cabra-cabra."

Croton olivaceus M. Arg. Linnaea 34: 93. 1865; 547.

Glabrous at maturity and olive-green including the compressed branchlets, the younger small ovate stipules and leaves sparsely pubescent with fulvous depressed-stellate trichomes; petioles slender, 4–7 cm. long; leaves lanceolate-elliptic, cuspidate or acuminate, 9–16 cm. long, 3.5–6 cm. wide, membranous, subentire, biglandular at acute base with 2 cylindric stiped glands, pinnate-nerved with about 8–10 pairs arcuate-ascending and incurved-joined; racemes lax, 1.5–2 dm. long, slender, the rachis glabrous; male pedicels slender, the glabrous calyces 3 mm. wide; stamens 30–40; filaments pilose below; petals oblong-obovate, puberulent; female flowers sessile, scarcely 2.5 mm. long, ovate-lanceolate; ovary fulvous pubescent; styles biparted; capsules sparsely depressed-stellate; seeds 7–8 mm. long, smooth except biseriately and lightly undulate-costate.—Color suggests many species of *Palicourea*, leaf-nervation species of *Tabernaemontana* (author). Nearly *C. sampatik* but maybe constantly different in glands and number of stamens. F.M. Neg. 7055.

San Martín: Tarapoto, *Spruce 4939*, type.

Croton palanostigma Klotzsch in Hook. Lond. Journ. Bot. 2: 48. 1843; 538. *C. Benthamianus* M. Arg. in Mart. Fl. Bras. 11, pt. 2: 105. 1873, fide Croizat.

Younger branchlets and petioles reddish pulveraceous-flocculose; stipules 7–8 mm. long, lanceolate, glandular-dentate; leaves broadly ovate, base cordate or subobtuse, acute, 12–17 (30) cm. long (petioles about a third as long), 9–14 (28) cm. wide, elobate or unequally trilobate, patellate-glandular at base, the younger cinereous tomentose beneath, finally more or less softly pubescent with radiately branched trichomes and the upper surface also punctate-scabrous with some minute patuliform glands; racemes elongate, bisexual even below, the lanceolate bracts 1–5-flowered; female calyx turbinate, acute at base, 5-angulate, to 4 mm. long (7 in fruit), 2 mm. broad, depressed stellate-tomentose (as male), the segments broadly triangular-ovate; petals obsolete or linear-spathulate; pedicels long, in fruit as much as 10 mm.; ovary orange-hirsute, style branches 2-parted, each branch 4–6-laciniate (Croizat); stamens often 11, the hispidulous filaments dilated, 3.5–4 mm. long (Croizat); capsules

small, about 4.5 mm. large, red-hirsute, the nearly smooth seeds almost 4 mm. long.—Williams noted this or some form of it as often attaining 15 meters, the straight round trunk 3 dm. or more in diameter. The sapwood and grayish or reddish-brown bark exude copiously (when injured) a bitter dark red-brown resin used in the treatment of fractures; see also *C. erythrochilus*, *C. huitotorum*, to which Croizat referred in herb. most of the following specimens. Illustrated, Mart. Fl. Bras. 11, pt. 2. *pl. 20.* F.M. Neg. 24471 (*C. Benthamianus*).

San Martín: Rocky stream banks, Tarapoto, *Williams 5844.*—Loreto: Morona-cocha, *Mexia 6512* (det. Standley). Mishuyacu near Iquitos, *Klug 966; 1187.* Lower Río Nanay, *Williams 644.* Iquitos, *Williams 7979; Tessmann 3610; 5111.* To the Guianas. "Shambu kiru" (Klug); "sangre de drago," "rucurana" (Williams), "uksvakiro" (Tessmann).

Croton pedicellatus HBK. Nov. Gen. & Sp. 2: 75. *pl. 104.* 1817; 639.

A shrub a meter or two high with slender terete finally glabrate branches, the upper scabrous with short dense stellate indument, this similar on petioles (these 3–9 mm. long, sometimes a little longer) and leaves above, the pubescence of these more tomentose beneath; stipules minute, conical; glands apparently lacking or obscure; leaves narrowly ovate-lanceolate, long-acuminate, obtuse or subacute at base, 2–3.5 cm. long or longer, 3–10 mm. wide or little wider; racemes subsecundly few-flowered, the female flowers solitary or few on pedicels 3–16 mm. long, calyx 2 mm. long; lobes not accrescent; bracts minute, ovate; male calyx scarcely 1.33 mm. wide, petals densely fimbriate; stamens 8–12, filaments pilose at base; ovary fulvous-tomentose; styles glabrous, biparted; capsules villous, 5 mm. long; seeds foveolate-punctulate, 3.5 mm. long.—Curiously, no material of this plant has been sent me.

Cajamarca: Rentema, Bracamoros, (*Bonpland*, type). Colombia; Brazil.

Croton peltophorus M. Arg. in Mart. Fl. Bras. 11, pt. 2: 154. 1873.

Branchlets glabrate, the tips appressed fulvous pubescent as the slender 3–4 (10) cm. long petioles; stipules obsolete; leaves triangular-ovate, broadly rounded or lightly cordate at base, long-acuminate, often about 10 cm. long, 5 cm. wide, obsoletely repand-

dentate, membranous, 8–10 subpinnate-nerved, sessile-biglandular at base, olive-green, sparsely appressed pubescent beneath, finally glabrate, the indument depressed stellate; racemes bisexual, small, the male bracts minute, 3-flowered, ovate, the female sessile, calyx about 1.5 mm. wide with linear-lanceolate acuminate not accrescent segments alternate with ovate obtuse petals or joined with an ample stiped oblique peltate gland, the narrow male petals villous only at base, the stamens glabrous, about 16, with anthers nearly twice as long as broad, the calyx fulvous tomentose; styles free, biparted; columella of dehiscent fruit scarcely more than 2 mm. long (Croizat). Var. *cuzcoanus* Croizat, Darwiniana 6: 468. 1944, has the leaves below the inflorescence often elliptic, the ovary pale yellow. A duplicate of a specimen labeled *C. pungens* in the Ruiz & Pavón herbarium at Madrid referred by Croizat to *C. Macbridei* looks remarkably like his variant of *C. peltophorus*. F.M. Neg. 24515.

Cuzco: Río Chaupimayo, *Soukup 789* (type, var.). Bolivia; Argentina and Brazil.

Croton perlongiflorus Croizat, Darwiniana 6: 467. 1944.

A 2-meter shrub with hispidulous-velutinous innovations; petioles soon about 3 cm. long; glands 2 or more, shortly stiped, more or less concealed; leaves ovate-lanceolate or ovate, subcordate at base, shortly acuminate, 4–7 cm. long, 2–4 cm. wide, adult glabrate above, the younger yellowish tomentose beneath, finally tomentose, veins sometimes well impressed, about 7 pairs, the first branched, subentire; inflorescences nearly flagelliform, to 3 or 4 dm. long, often bisexual; male flowers 3.5 mm. wide, 2.5 mm. long, stamens often 20–25; female flowers subsessile or sessile, scarcely 2 mm. broad, 2.5 mm. long, lobes triangular-acuminate, alternate glands manifest; ovary hispidulous; styles biparted, 2 mm. long, tomentose at base, fruiting column 3 mm. long.—Allied to *C. thurifer* HBK. and *C. spurcus* Croizat; in the thicker leaves and impressed veins simulating *C. Baillonianus* but easily distinguished by the smaller male flowers (Croizat). But compare also *C. Ruizianus* and allies which area is noted for intermediate forms. *C. Mandonis* M. Arg., 532, Bolivian, would key here but stamens many, spikes shorter than upper leaves, these larger with 2–4-stiped glands. It is probable that this form, however related, is typically only in Huancavelica.

Huancavelica: Tayacaja, 1,600 meters, *Weberbauer 6518*, type.—Cuzco: Valle de Urubamba, Ollantaytambo, 2,800 meters, (*Herrera*

2789). Cahacaha, Hacienda Tilque, (*Herrera 1668*). "Jaratu" (Weberbauer).

Croton perspeciosus Croizat, Journ. Arnold Arb. 21: 98. 1940.

Little tree, the younger parts sordidly subsericeous with a hispid indument; stipules pinnatifid, to 13 mm. long, 3.5 mm. wide; petioles 7–14 cm. long, with 4–8 stiped glands at apex; leaves ovate, definitely cordate, long-triangular-acuminate, shortly mucronate, 12–24 (30) cm. long, 7.5–14 (20) cm. wide, dentate or rarely sublobulate, margin minutely denticulate, glabrescent above except the 7–8 pairs of hispidulous veins, the first pair branching; racemes bisexual, none seen longer than 1 dm.; immature male flowers 2.5 mm. wide, pedicels 4–5 mm. long; female pedicels after flowering 2.5 mm. long, calyx scarcely 1 cm. broad, lobes triangular, entire, to 4 mm. long, 2.5 mm. wide, glabrous within; seeds coarsely few-rugose, 6 mm. long, nearly as broad, caruncle to 2 mm. broad.—Suggests *C. speciosus* M. Arg., 528, but that with much wider female calyx segments; certainly distinct from *C. quadrisetosus* in pubescence and in the character of flowers (Croizat). Compare *C. callicarpifolius* and *C. abutiloides* of Ecuador, perhaps the same but both typically with denser shorter tomentum.

San Martín: San Roque, *Williams 7378*.—Ayacucho: Open woods, Aína, 1,000 meters, *Killip & Smith 22841*, type. Carrapa, between Huanta and Río Apurímac, densely forested valley, *Killip & Smith 22402*.—Cuzco: Santa Ana, 900 meters, *Cook & Gilbert 1642*. Río Marcapata, *Vargas 3066*.—Pasco: Quillasu, 1,700 meters, *Soukup 3313*. "Sangre de drago."

Croton peruvianus Briquet, Ann. Cons. Jard. Bot. Genève 4: 228. 1900.

Upper branches densely stellate pubescent with widely spreading trichomes; stipules minute; petioles 2–2.5 cm. long; leaves ovate-lanceolate, rounded-subcordate at the biglandular base, caudate-acuminate, 8–9 cm. long, 3.5–4.5 cm. wide, above green but sparsely pubescent with simple trichomes, cinereous beneath with dense stellate pubescence, entire, nervation pinnate, the lateral ascending nerves about 8 pairs, scarcely prominent either side; racemes a dm. long or longer, rachis stelligerous; male pedicels 2 mm. long, glabrous or stellate as the ovate calyx segments, these 15–22 mm. long; stamens 16, sericeous-hispid below the upper third.—Likened in herb. by Mueller to *C. tarapotensis* M. Arg. and *C. soratensis* M. Arg.;

differs from first in indument, form and nervation of leaves, from the second even more by the absence of the stellate trichomes; our specimen seems to approach *C. lachnostachys* Baillon with, however, different foliage (Briquet). The midnerve has been described by Croizat as straw-colored with branched tomentum. Apparently not distinct from *C. stenosepalus*. F.M. Neg. 24517.

Amazonas(?): Without data, *Mathews 3019*, type.

Croton Pilgeri Ule, Verh. Bot. Ver. Brandenb. 50: 74. 1908.

Sometimes several meters tall, the younger branchlets, petioles, these 1.5–2 cm. long, and the 5 principal pinnate leaf-nerves bright reddish stellate-tomentose; stipules 3 mm. long, caducous; leaves broadly ovate-elliptic, long cuspidate-mucronate, biglandular at base beneath where whitish-green with dense stellate tomentum, dark green but stellate-asperous above, 9–12 cm. long, 5–6 cm. wide, with some capitate marginal glands; racemes dense, subequaling the leaves or about 1 dm. long, bracts 1 mm. long, the lower female, sessile, with 5 equal lanceolate segments 2 mm. long, glabrous within, stellate without as the male calyx, this with pedicels 2–3 mm. long, elliptic segments 2 mm. long; stamens 15–18; ovary as capsules tomentose-stellate; styles 2–4-parted; seeds 3 mm. long, ellipsoid, blue-gray, netted and ribbed. Maybe a variant of *C. tarapotensis*. F.M. Neg. 5146.

San Martín: Tarapoto, *Ule 6411*, type; *Williams 5409; 5536*. "Supayerillo."

Croton pungens Jacq. Icon. Rar. 3: 19. *pl. 622*. 1786–93; 540.

Becoming a small tree, the elongate terete branchlets above as well as stipules (5 mm. long), petioles (3–7 cm. long), leaves beneath and the many-flowered racemes shortly tomentose with stellate trichomes or sometimes some longer villous pubescence present; leaves cordate-ovate, cuspidate-acuminate, 9–15 cm. long, 4–8 cm. wide, basally 4–12-stipitate-glandular, 5-plinerved, denticulate, sparsely stellate-puberulent above; racemes 15–25 cm. long, often bisexual below; male calyces early 2.5 mm. wide, the basally cuneate petals barbate; stamens 40–65, filaments as receptacle lanate; pedicels slender, fruiting nearly 4 mm. long; ovary sparsely stellate; styles biparted, elongate; capsules globose, tridymous, 6 mm. long, 7 mm. broad, stellulate; seeds thick, coarsely undulate-subrugose.—Endemic to Venezuela and even if broadly interpreted does not occur farther south than eastern Colombia, but *C. sarcopetalus* of southern

Bolivia and Argentina is easily confused with it (Croizat). However, Mueller referred to it a Ruiz & Pavón specimen without data which Croizat has suggested may be *C. Macbridei.*

Peru (doubtful except sens. lat.). To Central America, Venezuela, and Brazil.

Croton pycnanthus Benth. Pl. Hartw. 247. 1846; 536.

Rigid, more or less copiously fulvous stellate-tomentose shrub except the subcoriaceous broadly ovate obtusely acutish leaves stellate pubescent above, these lightly cordate at the 2–6-glandular base, 5–7-plinerved, often 4–7 cm. long, 3–6 cm. wide, crenate-denticulate; racemes compactly many-flowered, 10–13 mm. thick, with rigid linear-lanceolate bracts; pedicels short; female calyx 4 mm. long, the segments broadly ovate, subobtuse; petals subulate, apically glandular; ovary stellate-tomentulose; styles biparted, the divisions bifid; male calyx 2 mm. wide, the cuneate petals lanate below; stamens 20–22; filaments hirtellous nearly their entire length.—Perhaps should be drawn to include the similar *C. Baillonianus* var. *submembranaceus* with longer petioles and pedicels. F.M. Negs. 5149, 32537.

Peru (probably; cf. note above). Ecuador.

Croton quadrisetosus Lam. Encycl. 2: 208. 1786; 531.

Upper branchlets reddish-succulent, densely pubescent as the petioles (3–4 cm. long) and elongate racemes, with a fulvous or early ferrugineous flocculose indument; stipules lanceolate-subulate, rigid, about 6 mm. long; leaves cordate-ovate, acuminate, 8–10 cm. long, 5–8 cm. wide, coriaceous-membranous, denticulate, punctiform-scabrous above with small trichomes, tomentose beneath, 5-plinerved and 4(2)-glandular at base, their stout floccose or glabrous stipes sometimes 4–5 mm. long, nearly as broad as the glands; bracts linear-lanceolate, the pedicels of both sexes little shorter than the calyces, this in the male flower opening 3–4 mm. broad, the obovate petals pubescent, stamens about 50–60; female calyx segments lanceolate-ovate, styles petaloid-dilated, much divided above, the laciniae entire; capsules globose, over 13 mm. broad.—The Bolivian *C. Mandonis* M. Arg., 532, has narrower bracts, style laciniae denticulate. In all probability, as suggested by Croizat, Journ. Arnold Arb. 21: 99. 1940, *C. quadrisetosus* is the earlier name for *C. callicarpaefolius* Vahl as to type. F.M. Neg. 39570.

Cajamarca: Hualgayoc, Monte Seco, 1,800 meters, *Soukup 3837*.—Junín: Palca, *Soukup 3480*. Without locality, *Dombey*, type, herb. Paris.—Cuzco: Idma, *Vargas 8549*.

Croton Rehderianus Croizat, Journ. Arnold Arb. 21: 100. 1940.

Subherbaceous shoots covered with a harsh beautiful reddish tomentum; petioles canaliculate with sessile binate glands both sides, the anterior smaller, 3.5–4 (8) cm. long; leaves ovate-caudate or sublanceolate-acuminate, cordate or incised cordate at base, 12–22 cm. long, 5–9 cm. wide, olive to reddish asperously lepidote-stellate above, grayish-flocculose stellate-tomentose beneath, the yellowish pubescent veins unequally 10–12-paired, ascending, sub–5-plinerved, margins lightly glandular serrulate; racemes seen scarcely longer than 5 cm. but probably often longer, bisexual but male flowers unknown; female bracts subequaling the solitary subsessile calyx, about 3.5 mm. large, lobes triangular to 2 mm. long, 0.5 mm. wide, ovary coarsely tomentose, globose; styles shortly bifid, glabrous, about 3 mm. long.—Name commemorates the able student of ligneous plants, particularly those of northern zones. Affinities of the species apparently are to be looked for in the vicinity of *C. bryophorus* (Croizat).

Cuzco: Brush-covered hillside, 2,200 meters, below Machu-Picchu, *West 6464*, type. "Mocco-mocco."

Croton rivinaefolius HBK. Nov. Gen. & Sp. 2: 80. 1817; 628. *C. alnifolius* HBK., l.c., not Lam. *C. Pavonis* M. Arg. Linnaea 34: 115. 1865; 609, fide Svenson. *C. Jamesoni* M. Arg. in DC. Prodr. 15, pt. 2: 549. 1866, fide Svenson.

More or less cinereous stellate-puberulent bush, variable also in size and shape of leaves; branchlets rigid; stipules subulate, small; petioles only a few mm. (–10) long; leaves usually ovate or -obovate, sometimes suborbicular, obtuse or acute, obsoletely or evanescently to prominently biglandular at base, typically 12–13 cm. long, 4–6 cm. wide, sometimes larger or often about half as large, somewhat dentate or subentire, finally glabrate above, pinnate-nerved or also shortly 3-plinerved; flowers apparently always dioecious (Svenson); racemes short or long, dense, the rachis more or less angled; bracts ovate-lanceolate, 1–3-flowered; male pedicels rigid or reflexing about as long as globose calyx, this 1.5 mm. broad, petals cuneate at base, lanate-ciliate; stamens about 15, filaments pilose or glabrous; female

flowers sessile, calyx segments narrow, not accrescent; ovary tomentose; styles biparted, the branches slender; capsules subglobose, lightly tomentose or glabrescent; seeds small.—Compare *C. alnifolius* which in Piura seems to be the same. I have compiled in part from Svenson, Amer. Journ. Bot. 33: 458–459. 1946, and the description is too broad if related forms are to be kept as species, for he remarks, "close to *C. Ruizianus* M. Arg. of the Lima region [cf. especially *Worth & Morrison 15692*] but differs in the less pubescent capsules, less rugose leaves and smaller seeds"; such comparative differences are of course meaningless. As he notes, the type of *C. Pavonis* may well have been collected by Tafalla and actually then came from Ecuador near Guayaquil. F.M. Negs. 7084 (*C. Pavonis*); 8507 (*C. Jamesonii*).

Peru (doubtful; cf. Svenson as noted above). Ecuador; Galapagos.

Croton rubiginosus Croizat, Journ. Arnold Arb. 21: 101. 1940.

Dichotomously or verticillately branched little shrub scarcely 5 dm. high, the shoots and leaves rusty lepidote-stellate; petioles slender, eglandular, 5 mm. long; leaves ovate or ovate-acuminate, rounded at base, 1.5–2 cm. long, 8–10 mm. wide, concolor, inconspicuously serrulate, with 3–5 pairs of obscure ascending veins; racemes bisexual to 1.5 cm. long; male flowers about 2 mm. large, stamens 8–10; petals glabrous, twice as long as the lobes; female pedicels barely 1 mm. long, calyx about 4 mm. long, 3 mm. broad, lobes marginally with a few glandular trichomes, 2 mm. long, 1.75 mm. wide, more or less elliptic, apex rounded; ovary subtrigonous, lanulate-tomentose, nearly glabrous when submature, glabrous styles parted to base.—Not allied to any species at present known from Peru (Croizat). The actual type sheet was at Berlin-Dahlem, presumably destroyed.

Amazonas: Open grassy land, eastern bank of the Marañón above Balsas, 2,000 meters, *Weberbauer 4273*, type.

Croton Ruizianus M. Arg. Linnaea 34: 89. 1865; 541. *C. pungens* Jacq. Icon. Rar. 3: 19. *pl. 622.* 1786–93; 540, probably as to Peru or the earlier name.

Often low and rather stockily branched, the growing tips and younger leaves densely and shortly tomentose with somewhat reddish-fulvous stellate trichomes, these becoming sordid gray and more or less deciduous from the leaves above; stipules obsolete; petioles often

only a cm. long; leaves ovate, rounded at base, acute, or sometimes merely apiculate, often 5–6 cm. long and nearly as wide (sometimes much smaller); lower nerves pinnate but more or less approximate; basal glands 2, sessile; racemes short, few-flowered, at most moderately long, the narrowly ovate-lanceolate or sublinear female calyx lobes shorter than ovary and not accrescent in fruit; male petals cuneate, barbate; stamens (20) 30–40, villous below; ovary densely stellate-tomentose; capsules subglobose, about 6 (7) mm. long, slightly broader; seeds dark gray or brownish, about 5 mm. long, lustrous and smooth unless for some undulation.—The var. *ovatus* M. Arg. is taken as the typical form: the var. *cordatus* M. Arg. l.c. is apparently distinct by virtue of the elongate lax racemes, longer petioles and the openly and deeply cordate almost caudate-acuminate membranous leaves; Croizat, Darwiniana 6: 448, suggested that this variety is the same as the Bolivian (not Peruvian as to type as Croizat states) *C. Frieseanus* M. Arg., 543, which ex char. has merely acutish lightly cordate leaves, 18 stamens and denticulate glandular stipules, doubtfully specific characters. *C. Ruizianus* seems to be distinguishable from *C. pungens* and it is probable that the Ruiz & Pavón specimen so referred by Mueller belongs as Croizat suggests, to *C. Macbridei*. As Svenson remarks, Amer. Journ. Bot. 33: 459. 1946, *C. Ruizianus* is very much like the typically more northern *C. rivinaefolius* with less pubescent capsules, less rugose leaves, smaller seeds; these differences it would seem could easily be included within a reasonable range of species' variation, but here as elsewhere in *Croton* the decision ought to be made by an able monographer. I have been tempted to include all these forms in *C. collinus*, which compare. The Cuzco plant apparently passes into *C. Baillonianus* and varies in petiole length; the central Peruvian plants are separable intangibly as *C. balsameus*. The typical form spreads a meter high or less; my collections with a citrous odor, as in *C. balsameus*, this probably the same. F.M. Negs. 5154; 34157 (var. *cordatus*).

Lima: Huaura and Sayán, *Ruiz & Pavón*, type. Above Huaytara, Pisco region, *Weberbauer 5423*. San Buenaventura, open rocky slopes, 2,700 meters, *Pennell 14524*. Matucana, in rocks, *217; 336; 2882* (det. Johnston); *Stork & Horton 9135; Soukup 2062* (det. Croizat, *C. Frieseanus*); *Grant 7477* (det. Croizat, *C. Frieseanus*).—Ancash: Ocros, *Weberbauer 2728*.—Junín: Quequena, *Isern 2040*.—Arequipa: Sandy plain north of Atiquipa, *Worth & Morrison 15648* (det. Johnston). Posco, *Rose & Rose 18806; (Guenther & Buchtien*

250, det. Burns). South of Chala, *Worth & Morrison 15692* (det. Johnston). South of Arequipa, *Eyerdam & Beetle 22131* (toward *C. collinus?*).—Cuzco: Open rocky slope, Ollantaytambo, *Pennell 13668; Cook & Gilbert 536*. Piri, *Vargas 5929*. Sisal, Prov. Anta, *Vargas 7282*.—Moquehua: Carumas, open mixed formation, 2,700 meters, *Weberbauer 7353* (det. Johnston, *C. Mandonis* Croizat, var. *cordatus*). Without locality, *Ruiz & Pavón* (type, var. *cordatus*). Bolivia? "Upalu" (Weberbauer), "cabra-cabra" (Cook & Gilbert).

Croton sampatik M. Arg. Linnaea 34: 94. 1865; 548.

Branchlets subterete with a few leaves crowded at their tips and as all younger parts shortly ferruginous stellate; stipules dentiform, subulate; petioles 4–7 cm. long; leaves oblong-ovate, obtuse at base, acuminate, 8–17 cm. long, 3–7 cm. wide, now obscurely, now deeply lobate-dentate, fragile but firm-membranous, very green but with some scattered depressed-stellate trichomes both sides, 5–7 pairs of distant lateral nerves, the lower two approximate, patellate-glandular at base; racemes subaggregate (often 3) at apex of branchlets, elongate, 15–20 cm. long, sometimes basal female flowers lacking, the male linear-lanceolate bracts 3–7-flowered, the calyx globose, 2.5 mm. wide before open; petals obovate, puberulent; stamens about 14, filaments glabrous, anthers short-ellipsoid; female calyx about twice as long as broad; ovary tomentulose; styles biparted, the branches entire.—Commonly the male and female flowers are mixed below; *C. Fraseri* M. Arg., 603, of Ecuador, known only from a completely female spike, seems to be the same. The Weberbauer tree was 25 meters tall. F.M. Neg. 5157.

Huánuco: Chicoplaya, *Ruiz & Pavón*, type.—Junín: La Merced, *Weberbauer 1889;* 282. Brazil. "Sampatik" (Ruiz).

Croton sapiiflorus Croizat, Darwiniana 6: 464. 1944.

Innovations and leaves beneath densely velvety tomentose with a pale-ochraceous or cinereous indument; stipules promptly caducous, triangular, 2 mm. long; petioles tomentulose, 1–3 cm. long; leaves elliptic or subobovate-elliptic, cuneate at base, shortly acuminate, 7–11 cm. long, 3–5 cm. wide, glabrate above, entire, with about 9–12 pairs of conspicuous ascending pinnate nerves, glands none or faint; spikes slender, uni- or bisexual, to 2.5 dm. long; male flowers about 2.5 mm. broad, stamens 15–20; female flowers immature but sessile, lobes more or less lanceolate, entire, 2–3 mm. long, 1.5–2.5 mm. wide, tomentulose, glabrate within; ovary truncate, hispidulous,

the separate 5 glands ellipsoid; petals minute, alternate with sepals; styles tomentose or hirsute, 4–5 mm. long, parted nearly to base.—Probably not at all remote from *C. leptostachys* HBK. of Colombia (author).

Huánuco: Canyon below Río Domingo, *4218*, type.

Croton scaber Willd. Sp. Pl. 4: 550. 1805; 559.

Branchlets slender, terete, shortly and rather sparsely as all younger parts reddish or fulvous tomentulose; stipules semi-ovate, semi-auriculate at base, setaceous above, 5–7 mm. long; petioles 1–2 cm. long; leaves ovate, lightly cordate at base, shortly acuminate, 10–12 cm. long, 4.5–6 cm. wide, membranous, subentire, early sparsely radiately lepidote, eglandular at base, 5-plinerved with 7–9 pairs of lateral nerves; racemes rather short, dense, bracts lanceolate-setaceous, 1-flowered, the shortly pedicelled female calyx with broadly ovate obtuse segments accrescent, in fruit 8–9 mm. long; ovary tomentulose; styles bifid to below the middle, the branches subentire; male calyx early about 3 mm. wide, 7 mm. wide when open; petals oblong-obovate, tomentose without, villous within, lanate ciliate; stamens about 15, filaments pilose entire length; capsules globose, tomentose; seeds minutely subimpressed puncticulate.—Mueller recognized several variants, the type being from Caracas; it is doubtful that a Ruiz & Pavón specimen referred here by him was correctly assigned; possibly mislabeled. *C. rhamnifolius* HBK., 634, apparently in Bolivia, may be expected; it has some hispid pubescence mixed with the tomentosity, eglandular or partly glandular. F.M. Neg. 5162.

Peru(?): Without locality, (*Ruiz & Pavón*). Venezuela.

Croton spurcus Croizat, Darwiniana 6: 467. 1944.

Glabrate shrub; petioles 1–3 cm. long; leaves ovate-elliptic, broadly rounded-truncate-cordate at base, more or less acuminate at apex, 2.5–7 cm. long, 2–4 cm. wide, irregularly and distantly glandular-serrate or subentire, ascending pinnate veins about 7 pairs, glands 2(–4), stipitate, patelliform; male pedicels 1.5–2 mm. long, buds about 1.5 mm. large; stamens 13; female flowers about 2 mm. wide and quite as long, brownish-orange stellate as pedicels, the broadly triangular lobes alternate with conspicuous substiped glands; ovary tomentose; styles biparted, 3–4 mm. long; capsules glabrescent, stipitate glands obvious, 7–8 mm. long, 5–6 mm. wide,

the seeds to 5 mm. long.—Like my *C. churumayensis* but larger capsules and seeds, smaller female perianth lobes, stiped ovary glands (author).

Lima: Amancaës, 500 meters, *Weberbauer 5249*, type.

Croton stenosepalus M. Arg. Linnaea 34: 114. 1865; 607.

Fulvous hispid-stellate especially the branchlets, setaceous stipules (6 mm. long), petioles (early short, finally 5–9 cm. long) and leaves beneath, these with 2 sessile glands at the subacute base, elliptic, cuspidate-acuminate, 7–12 cm. long, 4–8 cm. wide, subentire, rigid-membranous, more or less villous above with slender subsimple trichomes, pinnate-nerved; racemes dense, long as leaves, bracts setaceous; female flowers rather many, sessile, the subulate calyx parts acuminate, 5 mm. long; ovary hirsute; styles deeply parted, slender; male calyx at anthesis 2 mm., filiform-pedicellate; petals villous only at base; stamens about 15, the filaments hirsute below; capsules muricate-hispidulous, subtruncate both ends, 6–7 mm. long and broad; seeds fully 5 mm. long, lightly costate.—Very distinctive by the long lax trichomes dispersed over the upper leaf surface. F.M. Neg. 5171.

San Martín: Tarapoto, *Spruce 4160*, type; *Williams 5433* (det. Mansfeld).

Croton tarapotensis M. Arg. Linnaea 34: 114. 1865; 608.

Younger parts ferruginous tomentose; stipules small, lanceolate-subulate; petioles finally about as long as the leaves, these sometimes 1–1.5 dm., about half as wide, shortly 3-plinerved with 2 appressed glands at the rounded or somewhat cordate base, broadly or oblong-ovate, more or less cuspidate-acuminate, denticulate, lower secondary nerves remote from rest; racemes dense, female flowers many, their bracts conspicuously uni-patellate-glandular both sides, calyx segments ovate-lanceolate, the 2 posterior finally distinctly smaller, not accrescent; ovary tomentose; style branches rigid; male calyx nearly 2 mm. broad at anthesis, the pedicels suberect; petals subglabrous except at base; stamens 15 or 16; capsules subglobose, 4.5 mm. long, the seeds coarsely costate, 4 mm. long, 2.5 mm. broad (Croizat).—Certainly not in Argentina (Croizat). F.M. Neg. 7086.

San Martín: Tarapoto, *Spruce 4138*, type. Lamas, *Williams 6439*. Chazuta, *Klug 3980* (det. Croizat).

Croton Tessmannii Mansfeld, Notizbl. Bot. Gart. Berlin 9: 264. 1925.

Younger branchlets angulate, lepidote; petioles 2–3 cm. long; leaves oblong-elliptic or elliptic, slightly narrowed to the acute or subrotund base, acute or shortly acuminate, 7–19 cm. long, 2.5–6.5 cm. wide, lustrous and glabrous above except sparsely lepidote, especially on the midnerve, more densely lepidote but opaque beneath, obscurely 3–5-nerved at base, biglandular and minutely or repandly glandular-denticulate; racemes terminal, to 26 cm. long, lower bracts bisexual, the upper male, their lepidote pedicels to 6 mm. long, sepals and petals 3 mm. long, the former ovate, pilose both sides, the latter glabrous without; stamens 15; filaments glabrous, receptacle villous; female flowers with lepidote ovate obtuse sepals 3.5 mm. long, petals 3 mm. long, linear; ovary lepidote; styles dichotomously divided, to 4 mm. long.—A little tree, the trunk 10 dm. in diameter. Allied by the author to *C. surinamensis* M. Arg., 525, with pinnate nerved leaves equally lepidote both sides. F.M. Neg. 5186 (*Tessmann 3334*).

Loreto: Flooded areas, Yarina Cocha, *Tessmann 3438*, type. Cumaria, *Tessmann 3334* (fide author).

Croton thurifer HBK. Nov. Gen. & Sp. 2: 76. 1817; 606.

Softly stellate-tomentose shrub with the more or less inequilateral rhombic-ovate or rotund leaves of the related *C. alnifolius* but the first pair of nerves usually elongate at least to the middle of the blade; petioles 1–2.5 cm. long, hispidulous and densely tomentulose as the lightly angled branches; leaves obliquely rounded to acute or often cuneate at base, rounded, obtuse or shortly acute at the often oblique apex, 3–8 cm. long, 2–8 cm. wide, more or less glandular at base, the glands at least sometimes shortly stiped; racemes dense or lax when well-developed to a dm. long or longer, the rachis angled, the bracts minute; female calyx cupulate, the small ovate segments not at all accrescent; male petals lanate below; stamens about 16, pilose at base; ovary hispid and stellate as the rather rigid short styles below the tip. Two meters high (Weberbauer). F.M. Neg. 5187.

Cajamarca: Tomependa, inundated area along Río Marañón, *Bonpland*, type. Valley of the Río Shumba, 700 meters, *Weberbauer 6175* (det. Croizat).

Croton trinitatis Millsp. Field Mus. Bot. 2: 57. 1900. *C. chamaedryfolius* (Klotzsch) Griseb. Fl. Brit. W. Ind. 41. 1864, not Lam. *C. Miquelensis* Ferguson, Rept. Mo. Bot. Gard. 12: 49. 1901

(*C. Miquelianus* Ferguson ex Lanj. in Pulle Fl. Surinam 2: 38. 1932). *Geiseleria chamaedryfolia* Klotzsch in Hook. Lond. Journ. Bot. 2: 47. 1843.

Branches and usually stems slender and more or less stellulate-scabrous with appressed trichomes; petioles commonly a few mm. long, the ovate leaves 2–3 cm. long, about 1.5 cm. wide or in luxuriant states petioles 5 cm. long or longer, leaves 7 cm. long, 4 cm. wide, always with a pair of stiped glands at the rounded or subcordate base, gradually acuminate and rather to very coarsely crenate-dentate, paler and somewhat stellulate beneath; racemes axillary or terminal, few-flowered, bracts basally bilobed, pedicels short; male calyx 4–5-merous, the ovate segments acicular pubescent without; stamens 8–10, pilose at base with the receptacle; female flowers with sepals often unequal, stellulate, petals reduced, disk annular; ovary hirsute-stellulate as capsules, these 3–4 mm. long; seeds olive-gray, 3 mm. long, obscurely lineate-puncticulate.—Neither Lanjouw nor Standley and Steyermark, Fieldiana: Bot. 24, pt. 6: 80. 1949, bothered to indicate the reason for the adoption of the later name of Millspaugh; common as a weed near Iquitos, only a few collections cited. Illustrated, Miq. Stirp. Surin. Sel. *pl. 30.*

San Martín: Tarapoto, *Williams 5403.* Iquitos, *Killip & Smith 26921.* Yurimaguas, *Williams 3824.* Lower Río Nanay, *Williams 264; 474.* Alto Río Itaya, *Williams 3231; 3294.* Caballo-Cocha, weed in forest, *Williams 2476; 2477* (leaves large, det. Standley). Pebas, *Williams 1958.* To Mexico and the West Indies. "Sinchi pichana" (Williams).

Croton triqueter Lam. Encycl. 2: 214. 1786; 704. *Julocroton triqueter* (Lam.) Baillon, Adansonia 4: 368. 1863–4.

Branchlets compressed-trigonous, the trichomes not at all fastigiately radiate, in the angles and at the tips shortly rufous floccose and horizontally stellate; petioles early 3–4 cm. long, the lower becoming as long as the triangular-ovate leaf-blades, these often 8–12 cm. long, 3–8 cm. wide, more or less cordate, long-acuminate, crenate, shortly and densely stellate pubescent above, rather finely stellate tomentose beneath; spikes nearly strobiliform, 2.5–3.5 cm. long, 10–12 mm. thick or in fruit at least twice as long as broad; buds softly tricornute; flowers subsessile, the male calyx segments finally 4 mm. long, pubescent petals spatulate-linear, filaments pilose, the fruiting calyx segments 7 mm. long, 3 anterior broadly

ovate, deeply pinnate-lacerate; hypogynous disk entire; capsules 4 mm. long, the rugose-asperous seeds 3–3.5 mm. long.

Peru: According to Croizat. Mexico to Venezuela and Bolivia.

Croton Tyndaridum Croizat, Journ. Arnold Arb. 21: 101. 1940.

Tree, about 7 meters, the shoots early covered with a dense capitate-stelligerous indument; petioles 7–13 cm. long, the dense tomentosity partly concealing the 2 apical glands; leaves exactly ovate-rotund, shortly acuminate, 10–16 cm. long, 10–14 cm. wide, gray tomentose beneath, olivaceous and partly glabrescent above, subentire, veins about 8 pairs, the beautifully branched first pair subtriplinerved; racemes to 2.5 dm. long, only female observed, these at anthesis on pedicels about 0.3 mm. long; calyx 5 mm. broad, 3 mm. long, lobes ovate, acuminate, 3 mm. long, 1.5 mm. wide; ovary 4 mm. broad, hispidulous-tomentose; styles parted to base, scarcely 2.5 mm. long.—The author has named the plant for the mythological Tyndarides in honor of the botanical brothers Killip and Smith! He suggests that the species, unlike any other Peruvian form, may prove to connect *C. Urucurana* Baill., 545, of Brazil and *C. gossypiifolius* Vahl, 538, of Venezuela.

Junín: Along Río Perené, near "hacienda 3," in thickets, 600 meters, (*Killip & Smith 25229*, type).

Croton xanthochylus Croizat, Journ. Arnold Arb. 21: 102. 1940.

Small tree to 4 meters high, the tips sparsely pubescent with a strongly appressed fasciculate-stellate indument; petioles slender, 2.5–4 cm. long, with 2 subsessile patellate black glands at apex; leaves ovate-cuspidate, cordate at base, 6–8 cm. long, 4–5 cm. wide, glabrous above but lightly granulose under a lens, deciduously gray tomentulose beneath, membranous, entire, with about 8 pairs of slender anastomosing veins; racemes bisexual, slender, to 4 cm. long; male pedicels about 2 mm. long; stamens 10–12; female flowers subsessile; calyx scarcely 2 mm. large, setaceous lobes to 1 mm. long; ovary globose, about 1.5 mm. large, yellowish tomentulose; styles scarcely 1.5 mm. long; capsules globose, subglabrous, about 3 mm. large, the brown seeds 2.5 mm. long, 2 mm. broad, coarsely rugose and puncticulate.—Very close to *C. erythrochilus*, which has a sublepidote argillaceous indument, female pedicels distinct, about 1.5 mm. long; *C. Lechleri* is more robust, similar capsules but the

larger leaves with texture and indument of those of *C. draconioides* (Croizat). The type was lemon-scented.

Junín: La Merced, light-barked tree, sandy flat, *5308*, type. Along Río Perené near Hacienda "3," *Killip & Smith 25172* (det. Croizat with query).

10. ARGYTHAMNIA P. Br.

Ditaxis Vahl ex Juss. Euphorb. Tent. 27. *pl. 7*. 1824.

Reference: Pax & Hoffm., Pflanzenreich IV. 147. vi: 78. 1912.

Usually more or less shrubby, sometimes perennial herbs or annual but always somewhat pubescent with malpighiaceous trichomes or these only in part simple. Leaves alternate, often subsessile, oblong or ovate-lanceolate, entire or serrate, 3-nerved from base. Racemes ordinarily bisexual, often congested, basally female, above male, the bracts 1-flowered, the short pedicels sometimes reflexed in fruit. Male calyx at anthesis valvately 4–5-parted, the 4–5 petals entire, shorter or longer and more or less adnate as the 5 disk glands to the column, the stamens often 10, 1-verticillate (type, Wheeler) or 2–3-verticillate on the elongate column (and with or without staminodia) or this short and stamens only 4 or 6. Rudimentary ovary none or obsolete. Female sepals 5 (6), as petals these sometimes reduced or none. Disk glands free, rarely filamentous. Ovary 3-celled, styles basally connate or free, often bifid, the branches sometimes lobed. Capsules dehiscing into 3 2-valved cocci, the column persisting, the ecarunculate globose seeds often reticulate.—Pax & Hoffmann l.c., 51, maintained *Ditaxis* while Croizat, Journ. Arnold Arb. 26: 191. 1945, followed Bentham, in Benth. & Hook. f. Gen. Pl. 3: 303. 1880, in including it in the group of Browne which as to type has univerticillate stamens. The name has been spelled variously as *Argithamnia* by Swartz—this adopted by Pax & Hoffmann—*Argyrothamnia* by Mueller and *Argothamnia* by Sprengel; however, Wheeler, Contr. Gray Herb. 124: 40. 1939, showed that the name of P. Browne, 1756, is the earliest form.

Leaves oblong-ovate or elliptic, about 1.5 cm. wide; male sepals 4–5 mm. long; glands obsolete ..... *A. dioica.*

Leaves obovate, about 2 cm. wide; male sepals 8 mm. long; glands developed, adnate ..... *A. Katherinae.*

Argythamnia dioica (HBK.) M. Arg. Linnaea 34: 145. 1865; 56. *Ditaxis dioica* HBK. Nov. Gen. & Sp. 7: 170. *pl. 639*. 1825.

Much-branched shrub, the lightly angled branchlets sericeous pubescent as the entire plant except the leaves above including the sepals and petals both sides (except in male flowers subglabrous) and ovary, the indument intricate, especially on the leaves beneath; petioles 1–3 mm. long; stipules triangular, acuminate, coriaceous; leaves oblong-ovate or elliptic, obtuse or subacute, obtuse at base, 2.5–5 cm. long, 13–17 mm. wide, minutely glandular-serrulate, finally somewhat glabrescent above, subcoriaceous, the 3 basal nerves elongate; male racemes few-, female 1–2-flowered, the pedicels much shorter than calyx, scarcely accrescent in fruit; male sepals lanceolate-acuminate, 4–5 mm. long, the longer petals high adnate on column, spathulate-lanceolate, subobtuse; disk glands not at all evolute; stamens 10, biverticillate, staminodia papillose-hirsute; female sepals subcordate-ovate, acuminate, 5–7 mm. long, the lower margins overlapping, the petals little longer; disk glands confluent, glabrous; styles pilose, medially connate, free parts biparted, the lobes dilated and sometimes lobulate; capsules unknown.—Described as dioecious, an observation which Pax and Hoffmann rightly question, since related species are all monoecious.

Cajamarca: On the shore of the Amazon at Jaén de Bracamoros, *Humboldt 3604*, type; *Weberbauer 6222*.

Argythamnia Katherinae (Pax) Macbr., comb. nov. *Ditaxis Katharinae* Pax, Pflanzenreich IV. 147. vi: 56. 1912.

A 2-meter shrub, more or less appressed pilose including the petals and female sepals both sides and ovary, the apically foliate flowering branchlets and obovate leaves finally more or less glabrescent; stipules acuminate, 3 mm. long; petioles 1–4 mm. long; leaves rounded at tip, minutely apiculate, membranous, 3–5.5 cm. long, 15–27 mm. wide; racemes either with a solitary female flower and 5–8 male or entirely unisexual; bracts about 4 mm. long; flowers white, with the leaves developing or precocious, the sepals of the male narrowly lanceolate, acuminate, glabrous within, 8–9 mm. long, the slightly longer petals with medial nerve thickened below; disk glands attenuate both ends, completely adnate to column, this as filaments and 5 staminodia puberulent; stamens 10, biverticillate; female sepals ovate, cordate at base, 10–13 mm. long, the lower margins recurved, accrescent after anthesis; female petal with midnerve less enlarged, 7–12 mm. long; disk glands free, glabrous; styles shortly bilobed, the thick entire lobes glabrous.—Named for Kathe Hoffmann. *D. macrantha* Pax & Hoffm., l.c. vii: 426. 1914, of

Ecuador, has very thin glabrescent leaves 5.5–9 cm. long, 2.5–4.5 cm. wide, the female petals only 8–9 mm. long, disk annulate. Illustrated, Pax, l.c. p. 57.

Cajamarca(?): Los Reyes, route Chepen to Cajamarca, 1,000 meters, stony outcrops, *Weberbauer 4809; 4810*, types; 188 (under an unpublished name).

11. CHIROPETALUM Juss.

Reference: Pax & Hoffm., Pflanzenreich IV. 147. vi: 86. 1912.

Similar to *Argythamnia* but the petals of the male flowers palmately 3–7-parted with narrow lobes. Disk glands free. Stamens 5 or rarely 6. Seeds rugose-asperous.—Indument on upper parts often simple and stellate trichomes intermixed. The genus could readily be included in *Argythamnia* as by Baillon, M. Arg., and Bentham, but apparently there is no species intermediate in the highly distinctive character of the much-divided petals of the male flowers.

Indument of the leaves mostly or entirely stellate. . . . *C. Pavonianum.*
Indument of the leaves malpighiaceous and simple mixed.
Disk glands glabrous; leaves plinerved. . . . . *C. quinquecuspidatum.*
Disk glands (male) pilose; leaves basally 3–5-nerved.
C. Ruizianum.

Chiropetalum Pavonianum (M. Arg.) Pax, Pflanzenfam. 3, Abt. 5: 45. 1890; 89. *Argyrothamnia Pavoniana* M. Arg. Linnaea 34: 149. 1865.

A small shrub with virgate branchlets becoming glabrate below; petioles short; leaves ovate, acuminate, shortly contracted at base, 2–3.5 cm. long, 1–2 cm. wide, stellate-pilose, 5-nerved, the longish ascending secondary nerves not incurved toward the serrate margins; racemes few, slender, laxly flowered; bracts ovate, acute, not at all comosely exserted in the younger racemes; male pedicels shorter than the calyx; female sepals obovate-lanceolate, shortly acuminate, the male to about 1.5 mm. long, the nearly as long petals deeply 5-parted, the disk glands hirsute pubescent, those of female flowers puberulent apically; ovary villosulous; styles slenderly biparted; capsules 3 mm. thick, depressed, puberulent, the seeds asperous.—Perhaps should be drawn to include *C. molle* [Klotzsch] Klotzsch

ex Pax & Hoffm., 87, of southern Brazil, with twice as large leaves, a third larger flowers, glabrous glands.

Peru(?): Middle high Andes, *Pavón*, type.

Chiropetalum quinquecuspidatum (Juss.) Pax & Hoffm. Pflanzenreich IV. 147. vi: 92. 1912. *Croton quinquecuspidatum* Juss. Euphorb. Tent. 110. *pl. 8, fig. 26c.* 1824. *Chiropetalum peruvianum* Juss. Ann. Sci. Nat. sér. 1. 25: 22. 1832. *Argyrothamnia quinquecuspidata* (Juss.) M. Arg. Linnaea 34: 150. 1865.

Petioles a few mm. long; leaves ovate or lanceolate-ovate or the uppermost lanceolate, acuminate, contracted at base, dentate-serrate, 5-plinerved, the long-ascending secondary nerves subsericeous; racemes exceeding the leaves, the lower half naked, slender, laxly flowered; pedicels very short; male petals cuspidately 5–7-lobed, violet-purplish; female sepals triangular-ovate, acuminate; petals linear, entire; ovary pubescent; styles biparted nearly to base.—As suggested, could be a variant of the Chilean and Argentinian *C. tricuspidatum* (Lam.) Juss., 92, with 3-parted male petals and lanceolate female sepals.

Peru(?): Without locality, *Dombey*, type.

Chiropetalum Ruizianum (M. Arg.) Pax & Hoffm. Pflanzenreich IV. 147. vi: 94. 1912. *Argyrothamnia Ruiziana* M. Arg. Linnaea 34: 151. 1865.

Shrub about 2 meters high with striate-angulate branchlets, the younger fulvous pubescent; petioles 2–4 mm. long; stipules 2 mm. long, lanceolate-acuminate; leaves orbicular-ovate or ovate, cuspidately acuminate, contracted or subcordate at base, 4–5 cm. long, 2–4 cm. wide, serrate-denticulate, membranous, softly pilose both sides with malpighiaceous and simple trichomes, mostly simple especially beneath, basally 3–5-nerved; racemes slender, many-flowered, 4–7 cm. long, bracts 1.5 mm. long, pedicels about 2 mm. long, to 3 mm. in fruit, the 1–4 female flowers with densely pilose sepals finally 4 mm. long, minute linear petals, broad truncate disk glands, the acuminate male sepals 2 mm. long, the two-thirds as long petals 5–7-parted, globose disk glands pilose; stamens 5; ovary densely pubescent with malpighiaceous trichomes; styles medially bifid; capsules 5 mm. thick, depressed, pilose, the seeds 2 mm. in diameter.—*C. canescens* Phil. (*C. sponiella* (M. Arg.) Pax, 93), Chilean and Bolivian but accredited to Peru by Pax (wrongly) has leaves 2–3 cm. long, glabrous disk glands; the more similar *C.*

boliviense (M. Arg.) Pax & Hoffm., 94, apparently has only the leaf-nerves villous pubescent. F.M. Neg. 7121.

Lima: Cheuchen, *Ruiz & Pavón*, type. Matucana, among large rocks, *348* (det. Johnston).—Junín: near Tarma, *Ruiz & Pavón*.—Huánuco: Slender shrub along trail, Yanano, *3710* (det. Johnston). Near Chaglla, 2,800 meters, *Weberbauer 6695* (det. Pax).—Ayacucho: Huanta, in bushes above Osno on the Río Apurímac, *Weberbauer 5594* (det. Pax).

12. CAPERONIA St. Hil.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. vi: 27. 1912.

Annual or perennial usually setose-hispid and glandular herbs with alternate acutely serrate ordinarily narrow or oblong-ovate leaves and axillary peduncled racemes or spikes of generally monoecious petaliferous flowers solitary in the scattered bracts, the more numerous male above, the few female below, the 5 imbricate calyx lobes of these often enlarged in fruit. Disk none. Male flowers with 5 valvate sepals, 5 imbricate often unequal petals. Stamens usually 10, biseriate; anthers ovoid. Rudimentary ovary on tip of the cylindric stamen-column entire or minutely tridenticulate. Petals of female flowers narrower or reduced. Ovary sessile, 3-celled; styles short, palmately dissected. Capsules tridymous, hispid or echinate separating into bivalved cocci, the subglobose seeds ecarunculate.—Commemorates pre-Linnaean pharmacist Caperoni, who first called these plants to the attention of botanists.

Male petals very unequal; leaves obscurely serrulate. . . *C. zaponzeta.*

Male petals alike; leaves closely serrate.

Younger stems appressed pubescent, the older glabrate and often fistulose. . . . . *C. castaneifolia.*

Younger stems with more or less spreading often glandular pubescence, all usually obscurely or not fistulose. *C. palustris.*

Caperonia castaneifolia (L.) St. Hil. Hist. Pl. Remarq. Brésil 245. 1824; 31. *Croton castaneifolius* L. Sp. Pl. 1004. 1753.

Much like *C. palustris* but usually more erect and the older stems septate and fistulose, glabrous or nearly, a cm. or more in diameter; stipules broadly ovate; petioles to 4.5 cm. long; leaves to 16 cm. long, 3–8 mm. wide; male sepals 2 mm. long; capsules 7–8 mm. thick, 4 mm. long, 3-sulcate. Illustrated, Pax & Hoffm. l.c. p. 32.

Cajamarca: Tomependa, Jaén de Bracamoros, (*Bonpland*). Mexico; West Indies; South America.

Caperonia palustris (L.) St. Hil. Hist. Pl. Remarq. Brésil 245. 1824; 33. *Croton palustris* L. Sp. Pl. 1004. 1753.

Annual often spreading and attaining several dm., the terete striate unarmed stems (at least above), petioles, these 5–25 mm. long, and peduncles setulose with glandular spreading rigid trichomes; stipules lanceolate, acuminate, 3–5 mm. long; leaves variable in form, the smaller lower elliptic-obovate and obtuse, the upper ovate to lanceolate, even linear-lanceolate, usually 7–12 cm. long, 1–5 cm. wide, all membranous, deeply and somewhat irregularly serrate, the larger with 11–26 straight secondary nerves; racemes spiciform, the lower 3–5 flowers female with unequal obovate sepals becoming in fruit about 5 mm. long, setulose, spathulate-lanceolate obtuse or acute petals about half as long, densely glandular ovary, the short laciniate styles nearly concealed in the glands; male sepals not accrescent, lanceolate, acute, 1–1.5 mm. long, the obtuse petals scarcely longer; stamens 10; ovary rudiment cylindric, apically denticulate; capsules 6–7 mm. thick, 5 mm. long, muricate, the ovoid foveolate seeds 2–3 mm. long. Illustrated, Pax, l.c. *fig. 1*, p. 4, and *fig. 6*, p. 32; O'Donell & Lourteig, Lilloa 8: p. 58.

San Martín: Tarapoto, *Spruce 2473*. Without locality, *Ruiz & Pavón* (det. Mansfeld). Mexico and West Indies to Argentina; Africa; Madagascar.

Caperonia zaponzeta Mansfeld, Notizbl. Bot. Gart. Berlin 9: 265. 1925.

Stems lightly puberulent-pilose and aculeate, hollow and about 6 mm. thick in flowering portions; stipules 2.5 mm. long; petioles pilose, 3 mm. long; leaves elliptic or lanceolate-elliptic, rounded at base, acute to acuminate, 10–18 cm. long, 3.5–5 (7) cm. wide, glabrate or early sparsely appressed pilose both sides, chartaceous, the remote, dentations about 0.5 mm. long, racemes axillary to 13 cm. long including the half as long peduncle, basal female flowers 3, the apical male crowded on the pilose rachis, the former with broadly ovate abruptly short-acuminate sepals, these like the spathulate petals 3 mm. long and pilose both sides; ovary densely glandular, styles obovate-cuneate, lacinulate; male sepals ovate, acute, 3 mm. long, sparsely pilose, the glabrous petals unequal, the larger ovate, obtuse, 2 mm. long, smaller spathulate, 0.7 mm. long; stamens 10,

biverticillate; rudimentary clavate ovary 3-denticulate.—The fruits are densely and rather rigidly echinate, about 5 mm. broad. Near *C. heteropetala* but that with retuse male petals, glandular lanceolate female sepals, more dentate leaves (Mansfeld). The common name according to the collector means "sea cow teeth." F.M. Neg. 5224.

Loreto: Overhanging shore, shrub-like herb, Yarina Cocha, *Tessmann 3386*, type. La Victoria, *Williams 3124* (det. Mansfeld); *2823*. Puerto Arturo, Yurimaguas, *Williams 5197* (det. Standley). Maucallacta, Río Paranapura, *Klug 3954* (det. Standley). "Zaponzeta."

13. DALECHAMPIA [Plum.] L.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. xii: 1–56. 1919.

Shrubs, often scandent, the pubescence if any simple and sometimes stinging. Leaves undivided or 3–5-lobed or -foliate, bistipulate and the petioles usually distinctly bistipulate. Inflorescences with 2 often large and colored bracts, these bistipulate and serving as an involucre to a lower female 3-flowered 3-bracted dichasium and an upper 4-bracted male pleiochasium, its bracts often urceolate-connate, and composed of 3-flowered male cymes, 1-flowered female cyme and sterile flowers. Male calyx 4–6-parted; stamens many, filaments short. Female calyx with 5–12 imbricate often pinnatifid indurating sepals. Ovary 3(4)-celled; styles connate, the long column apically obtuse or dilated. Bivalved cocci on persisting column; seeds globose, ecarunculate.—The genus commemorates Jacques Dalechamps, early sixteenth century botanist of Lyon.

Leaves undivided.
  Female sepals undivided.
    Plants scandent; leaves rounded at base.....*D. micrantha.*
    Plants erect; leaves narrowed to base.
      D. brevipedunculata, D. spathulata.
  Female sepals pinnatifid.
    Style column spreading-capitate, dilated above (typically); bracts at least 2 cm. long.
      Leaves usually glabrate in age; bracts 2–3 cm. long.
        D. dioscoreaefolia.
      Leaves tomentose beneath; bracts 4–10 cm. long.
        D. aristolochiaefolia.
    Style column not so dilated apically; bracts 15–18 mm. long.
      D. hispida.

Leaves at least in part lobed or trifoliate; female sepals pinnate.

Leaves with 3 leaflets.

Sepal segments (female flowers) early capitate-glandular; leaflets thin, 3–5 cm. wide.....*D. cissifolia.*

Sepal segments not capitate-glandular; leaflets firm, narrow. *D. Weberbaueri.*

Leaves more or less deeply lobed, at least in part.

Stipules conspicuously glandular-setose.....*D. stipulacea.*

Stipules not glandular-setose.

Involucral bracts 1.5–4 cm. long, 5-nerved.

Bracts 4 cm. long; sepals in fruit about 3 cm. long. *D. Uleana.*

Bracts 1.5–3 cm. long; sepals in fruit about 1 cm. long. *D. scandens.*

Involucral bracts 3–6.5 cm. long, 7–9-costate...*D. tiliaefolia.*

Dalechampia aristolochiaefolia HBK. Nov. Gen. & Sp. 2: 99. 1817; 47.

Liana, the younger branchlets puberulent-tomentulose and sparsely hirsute, the 5–10 mm. long petioles densely so; stipules to 9 mm. long; leaves ovate-lanceolate, shortly acuminate, basally cordate, 7–11 cm. long, 3–7 cm. wide, palmately nerved, minutely denticulate, linearly bistipulate, pubescent above, densely tomentose beneath; inflorescences terminal, often on leafy or leafless branchlets; bracts suborbicular, 4–7 (10) cm. long, narrowed to obtuse base, incised dentate, sometimes rather trilobate, pilose on the 5–7 nerves, rose or reddish-violet, in fruit to 10 cm. long; stipules 1–2 cm. long, lanceolate, often unequal; female bracts reniform-ovate, obtuse, lateral much smaller, male glabrous, lustrous as the male calyx, the stamens about 50; female sepals around 10, with 5–6 linear lacinulae, eglandular, after anthesis 5 mm. long; ovary villous; column 3–4 mm. long, finally twice as long, often dilated to pileiform stigma; capsules 12 mm. broad, cocci carinate; seeds 5 mm. long, muriculate, variegated.—Pax and Hoffmann observed in some specimens style not pileiform-dilated. Cultivated for adornment (Herrera) and well worth it for the showy bracts. Illustrated, Pax & Hoffm. l.c. 47.

Cajamarca: San Felipe, Bracamoros, *Humboldt*, type. Shrub land, Socota, *Stork & Horton 10093* (det. Standley). Below Rambrán, 2,000 meters, *Weberbauer 4801*.—Huánuco: Yanano, *3802* (det. Johnston). Llamapanahui, *Ruiz & Pavón* (det. Mansfeld). Valley

of the Marañón, *Weberbauer 4256;* 191.—Amazonas: Between Balsas and Celedin, *Stuebel 45d.* Hacienda Limón, *Osgood & Anderson 59.*—Apurímac: Chaupimayo, *Soukup 812.* Pachachaca Valley, *Goodspeed Exped. 10563.*—Cuzco: Valle de Apurímac, Hacienda Marcahuasi, 2,450 meters (*Vargas*). San Miguel, Urubamba Valley, *Cook & Gilbert 1022* (det. Standley). "Bella abanquina" (Vargas), "etepen ccaccha" (Cook & Gilbert).

Dalechampia brevipedunculata Ule, Verh. Bot. Ver. Brandenb. 50: 82. 1908.

Like *D. spathulata* but peduncles only 2–3 cm. long, female sepals 3 mm. long; petioles 3–4 mm. long; leaves 10–12 cm. long, 3.5–4.5 cm. wide; style column 4 mm. long; capsules 10 mm. long, 7 mm. broad; seeds 4–5 mm. long, aculeolate.—Probably will prove to be a variant of the similar species. F.M. Neg. 5332.

San Martín: Tarapoto, *Ule 6504.*—Loreto: Yarina Cocha, *Tessmann 5408* (det. Mansfeld). Brazil.

Dalechampia cissifolia Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 20. 1845; 19. *D. triphylla* Lam. var. *cissifolia* (Poepp.) M. Arg. in DC. Prodr. 15, pt. 2: 1239. 1866.

Climbing, the branchlets and petioles, these 4–9 cm. long, at least early hispid as also the leaves on both sides, the latter composed of 3 sessile or petiolulate thin-membranous leaflets, 8–10 cm. long, 3–5 cm. wide, the intermediate oblong-obovate, the lateral obliquely ovate, all subdenticulate, reticulate-veined; stipules 8, stipels 3–4 mm. long; peduncles 1–1.5 cm. long or in fruit as much as 4 cm.; involucral bracts orbicular, 3-lobed, denticulate, 2–2.5 cm. long (or apparently shorter), the stipules lanceolate, 5 mm. long; intermediate female bracts reniform-ovate, lateral connate into one, all ciliate and marginally glandular, the 10–12 sepals pinnately parted with elongate filiform divisions, after anthesis 15 mm. long, the laciniae 3–4 mm. long; ovary puberulent; style column 5 mm. long, slightly dilated at tip; capsule subglabrous, 8 mm. thick, the pedicel 1 cm. long; seeds 3 mm. in diameter, black.—Not at all closely allied to *D. triphylla* of southern Brazil (Pax & Hoffm.) the coarser laciniae of the female sepals not capitate-glandular as in the Peruvian plant. However, the constancy of the character is certainly often obscure and accordingly its taxonomic importance remains to be proved by the study of more collections. Compare also *D. juruana* Ule under *D. Weberbaueri;* from the material seen it is not clear that there is

specific significance as there is no concomitance between size of bracts, peduncle length and sepal glandulosity. The San Martín material with smaller bracts could be *D. Weberbaueri.* F.M. Neg. 5335.

San Martín: Lomas, *Williams 6328.* Juanjuí, *Klug 4208* (det. Standley). San Roque, *Williams 7492.*—Loreto: Yurimaguas, *Poeppig 2085,* type. Iquitos, *Williams 8051.* Mishuyacu, *Klug 523.* Balsapuerto, *Klug 3102* (det. Standley, but short peduncles of *D. juruana!*). La Victoria, *Williams 2888.* Letecia, *Williams 3159.*

Dalechampia dioscoreaefolia Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 20. 1845; 46.

Liana with slender sulcate-striate more or less pubescent branchlets, petioles (2–8 cm. long) and leaves, all often glabrescent in age; leaves ovate, shortly contracted into the openly cordate acute base, 5.5–16 cm. long, 4–11 cm. wide, denticulate or subentire, palmately nerved, membranous; stipels filiform, stipules to 6 mm. long; peduncles solitary or geminate, 1–6 cm. long; bracts ovate, acuminate, contracted to petiole, incised-dentate, 2–3 cm. long, 1.5–2 cm. wide, pink, pilose, 5–7-nerved, deciduous; stipules persisting, often unequal, ovate, reflexed, to 7 mm. long; flowering bracts glabrous, erose, the female concave, subsaccate; male calyx pilose, stamens about 15; female sepals 6–12, with 4–6 laciniae each side of the linear rachis, long pilose, not capitate, indurating, 7–10 mm. long; intersepalous glands small; ovary sericeous, style column finally 8 mm. long, dilated into piliform stigma; capsules 12 mm. broad, 7 mm. long, stipe 2 cm. long; seeds 5 mm. long, irregularly costulate and rugulose, pale-mottled.—The var. *pubescens* M. Arg. has the leaves pubescent beneath, fruiting sepals only 7 mm. long. The Amazonian *D. affinis* M. Arg. has linear involucral stipules and laciniae of the female sepals capitate-glandular. F.M. Neg. 5338.

San Martín: Juanjuí, *Klug 4186* (det. Standley). Tocache, *Poeppig 1907,* type, and *2163; Williams 4228.* Tarapoto, *Spruce 4476* (var.). Chazuta, *Klug 4013.* Without locality, *Ruiz & Pavón.* —Junín: La Merced, *5384; Soukup 2457.*—Loreto: Lower Río Nanay, *Williams 303.* Río Itaya, *Williams 32.* Iquitos, *Williams 8186; Klug 550; 753; 1037.*

Dalechampia hispida Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 19. 1845; 48.

Hispid-hirsute liana, the pubescence extending even to the female sepals and ovary with the exception of the bracts; petioles 7–7.5 cm.

long; leaves ovate, openly cordate, acuminate, 14 cm. long, 9 cm. wide, palmately nerved, membranous, denticulate; stipules 5 mm. long, stipels filiform-linear; peduncles 1–1.5 cm. long; bracts green, 18 mm. long and little wider, truncate-cordate, shortly 3-lobed, denticulate, subglabrous; female bracts subequal, broadly reniform-ovate, obtuse, denticulate, glandular-ciliate, the sepals 10, pinnate, with 4–5 filiform laciniae, finally 15 mm. long, rachis filiform, indurate, style column slender, slightly enlarged at tip; capsules 5 mm. long, twice as broad, glabrate, the lustrous mottled seeds smooth. F.M. Neg. 32441.

San Martín: Tocache, *Poeppig 2016*, type.

Dalechampia micrantha Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 19. *pl. 222.* 1845; 7. *Rhopalostylis buettnerioides* Klotzsch ex Baill. Adansonia 5: 317. 1864–5.

High-climbing liana with undivided basally 5-nerved leaves; petioles 2.5–4.5 cm. long, puberulent as the peduncles and male calyces, these clavate in bud with about 13 stamens; leaves ovate, obtusely acuminate, rounded-truncate at base, obscurely denticulate, 9–14 cm. long, 5–13 cm. wide, short-pubescent on nerves; caducous stipules 3 mm. long, lanceolate, the stipels narrower; peduncles axillary, usually branched at base, to 2 cm. long; involucral bracts 2.5–4 mm. long, broadly lanceolate from base, acuminate, shorter and narrower than the ovate stipules; female bracts broadly ovate, acute, subtridentate, the male obovate, subtruncate, denticulate; flowers lutescent, the 5–6 lanceolate ovate acute entire sepals glandular at base; ovary pubescent; style column to 9 mm. long, clavate, glabrous; capsules 13 mm. thick, ligneous, the cocci carinate; seeds 5 mm. across, smooth.—Illustrated, Pax & Hoffm. l.c. 8. F.M. Neg. 7200.

Loreto: Near Iquitos, *Ule 6254; 6255; Williams 3629* (det. Mansfeld). To the Guianas.

Dalechampia scandens L. Sp. Pl. 1054. 1753; 32.

Slender-stemmed vine, the branches often early more or less pubescent as the leaves beneath, the indument commonly puberulent or short-pilose, not rarely sparse or sub-lacking especially in age; petioles 2–many cm. long; leaves 3–5-parted medially or usually more deeply, sometimes nearly to base, said to range 2.5–14 cm. long and at least as wide, lateral lobes oblique, all shortly acuminate or acute or if obtuse, mucronate; stipules reflexing, 2–10 mm. long;

stipels subulate, 1–3 mm. long; peduncles 1.5–6 cm. long; involucral bracts pale, 5-nerved, 1.5–3 cm. long and quite as wide, broadly ovate, cordate at base, 3-lobed often medially, typically glandular-ciliate and more or less hirsutulous; male calyx glabrous or puberulent, stamens 20–27 (rarely 4–5), female sepals 7–10, rachis ordinarily lanceolate with 3–7 pairs of laciniae, capitate glandular and setose, 5–9 (12) mm. long; ovary pubescent; style-column often dilated apically; capsules 7–10 mm. broad; seeds globose, 2.5–4 mm. in diameter, smooth, whitish or brown mottled.—The monographers discriminated twelve variants which, at least as they have defined them, do not seem to have taxonomic importance.

Tumbez: Mountains east of Hacienda Chicama in deciduous bushwood, *Weberbauer 7650; 7667*.—Piura: Pariñas Valley, *Haught 276*.—Junín: In brush along trail, La Merced, *5284* (det. Johnston).—Cuzco: Quillabamba, *Goodspeed Exped. 10448* (det. Standley). Generally distributed in warmer regions.

Dalechampia spathulata (Scheidw.) Baill. Etude Gen. Euphorb. 487. 1858; 9. *Cremophylla spathulatum* Scheidw. Bull. Acad. Brux. 9, pt. 1: 23. 1842. *D. amazonica* (Ule) Macbr. Candollea 8: 26. 1940.

Shrub, glabrous unless the young parts, puberulent petioles, these 2–10 mm. long, leaf-nerves beneath, peduncles, these 2–6 mm. long, and bracts (sometimes hirsute), ovate or orbicular, acute or acuminate, 2.5–4 cm. long, 2–4 cm. wide, more or less dentate, 3-nerved, often roseate or lutescent; stipules 3–8 mm. long; leaves obovate-spathulate, long-decurrent at base, typically subabruptly acuminate, to 2.5 dm. long, 1 dm. wide; female bracts elliptic, lateral linear-lanceolate, subulate-acuminate; male broadly ovate; male sepals puberulent; stamens 15; female sepals 6, linear-lanceolate, 1 mm. long, alternating with 1–2 laciniae; ovary pubescent; style column slender, 5–10 mm. long; capsules 5.5 mm. long, 9 mm. broad; seeds globose, softly muriculate.—Has been in cultivation. The Peruvian form is var. *amazonica* Ule, the bracts hirsute all over the inner surface. The related species are *D. magnoliifolia* M. Arg., 11, the elliptic-lanceolate leaves narrowed both ends, and *D. brevipedunculata* Ule, 11, apparently much like *D. spathulata* but peduncles only 2–3 mm. long, female sepals 3 mm. long; the former could be represented by *Killip & Smith 28920* but is doubtfully specifically distinct. Illustrated, Pax & Hoffm. l.c. 10 ex Pflanzenfamilien 3, Abt. 5: 68.

San Martín: Tarapoto, *Ule 6505* (type, var.).—Loreto: Yurimaguas, *Poeppig 2380; Williams 4189*. Santa Rosa, *Killip & Smith 28920*. Amazonian Brazil to Central America.

Dalechampia stipulacea M. Arg. Linnaea 34: 221. 1865; 27.

More or less hirsute or villous pubescent liana with conspicuous stipules 2–3 cm. long, variously glandular-setulose and with dissected stipules within; petioles 4–9 cm. long; leaves about medially 3-lobed, deeply and narrowly cordate at base, the ovate or oblong lobes acute or acuminate, firm-membranous, usually stipitate glandular-ciliate; peduncles axillary and terminal, 3–4 in fruit 5–6 cm. long; involucral bracts 3–4 cm. long or larger, greenish-white, rotund, lobate, glandular-fimbriate and hirsute; female bracts ovate, obtuse, male eglandulose; male flowers 4 mm. wide; stamens 55; female sepals 10–12, 10–18 mm. long, pinnate with many laciniae, these apically capitate-glandular; ovary tomentose; style column lightly dilated at tip; capsules 12 mm. thick; seeds smooth, 4 mm. in diameter, white and brown mottled.—The Peruvian plant, very probably a distinct species (Pax & Hoffmann) is var. *major* M. Arg. in Mart. Fl. Bras. 11, pt. 2: 656. 1874, the leaves villous both sides with long trichomes, bracts 5–6 cm. long, 7-nerved; fruiting sepals to 18 mm. long, long white-setulose; nearly all parts more robust. F.M. Negs. 5355; 29352; 34053.

Junín: Vitoc, *Ruiz & Pavón*, type. Brazil; Venezuela; Colombia; Paraguay; Argentina.

Dalechampia tiliaefolia Lam. Encycl. 2: 257. 1786; 37. *D. peruviana* Lam. l.c.

Liana, all the younger parts more or less puberulent-tomentulose, the leaves becoming glabrescent above; petioles 2.5–8 cm. long; leaves ordinarily diverse on the same stem or branch, but sometimes all undivided or 3-lobed, the former usually 7–14 cm. long, 4–12 cm. wide, cordate, broadly ovate, the latter 7–17 cm. long, nearly as wide, the middle lobe oblong-elliptic, the lateral very inequilateral, all denticulate; stipules 3–5 mm. long, subulate, stipels 2–4, 2 mm. long; inflorescences terminal on few-leaved branchlets, the yellowish-white bracts 3–6.5 cm. wide and long, merely shortly 3-dentate, prominently 7–9-nerved, the stipules 2.5 mm. long; female bracts truncate, often yellowish, 3-lobed, softly pilose-puberulent, the male ovate; calyx glabrous; stamens about 40; female sepals 12–13 pinnate with about 13 laciniae, hispid, non-capitate-glandular, after anthesis

attaining 15 mm., plumose-hispid; ovary hispid; style column elongate, campanulate-umbraculiform, 3-lobate; capsule 11 mm. broad, verrucose; seeds 5 mm. diameter, greenish-gray, brown mottled.—The tropically widely distributed *D. scandens* L. has regularly 3–5-lobed leaves, shorter fruiting sepals, smaller seeds. Except as noted determinations by Standley. Illustrated, Pax & Hoffm. l.c. 38.

Junín: La Merced, sunny riverside brush, *5543* (det. Johnston); *Killip & Smith 23824*. Chanchamayo Valley, *Schunke 378*. Colonia Perené, *Killip & Smith 24999; 25060*.—San Martín: Juanjuí, clearing, *Klug 4331*.—Loreto: Yurimaguas, *Poeppig 1886*. Without locality, "Peru," *Jos. Jussieu*, type.—Río Acre: *Ule 9542*. To Central America, Trinidad and southern Brazil.

Dalechampia Uleana Pax & Hoffm. Pflanzenreich IV. 147. xii: 31. 1919.

Liana, the branchlets, petioles (7–12 cm. long), 5 leaf- and bract-nerves more or less ashy puberulent; leaves deeply and openly cordate at base, 8–16 cm. long, 11–20 cm. wide, chartaceous, reticulate-veined, more than medially 3-lobed, the middle lobe obovate, abruptly acuminate, the spreading lateral very inequilateral, all repand-denticulate; stipules ovate, 7 mm. long, 5 mm. wide, stipels filiform, 4 mm. long; axillary peduncles 5–7 cm. long; involucral bracts similar to leaves, greenish-purple, 4 cm. long, 5 cm. wide; stipules 1.5–2 cm. long, elliptic; female bracts rotund, lateral connate, sparsely pilose, male suborbicular, free, the calyx pubescent and with 80–90 stamens; female sepals about 10, pinnate with about 27 pubescent non-capitate-glandular laciniae, after anthesis to 3.5 cm. long loosely enclosing the capsule, this 16 mm. long and broad, verruculose, the pedicels 2–4 cm. long.—Illustrated, Pax & Hoffm. l.c. 38. F.M. Neg. 24380.

Río Acre: In woods at Nueva York, *Ule 9541*, type. Brazil.

Dalechampia Weberbaueri Pax & Hoffm. Pflanzenreich IV. 147. xii: 21. 1919.

Liana with slender striate villous stems, the ultimate filiform; petioles 1–4 cm. long, pubescent as the branches; leaflets 3, 2–5 cm. long, 5–13 mm. wide, middle lanceolate, lateral inequilateral, oblong-lanceolate, base semi-cordate, acute, denticulate, firm-membranous, pubescent both sides; stipules linear, 4–5 mm. long, stipels subulate, 2 mm. long; peduncle axillary or terminal on leafy lateral branchlets, slender, 1.5–3 cm. long; involucral bracts broadly ovate, cordate

at base, about 14 mm. long, less than medially 3-lobed, denticulate, green; stipules 2–3 mm. long; intermediate female bracts scarcely 1 mm. long, truncate, the male connate; male calyx pubescent; stamens 6–7; female sepals about 12, pinnate, 1-laciniate below each side, apically with 2–3 linear laciniae, pilose, fruiting 5–6 mm. long; ovary tomentose; style column 3-lobed; capsules 6 mm. thick; seeds 2.5 mm. in diameter, black and mottled.—Perhaps a variety of the earlier *D. juruana* Ule, 21, which as to type had stouter peduncles about 1 cm. long, entire leaflets. Apparently both plants too near *D. triphylla* Lam. but the involucral bracts smaller and in type of *D. juruana*, one trifid, others entire.

Cajamarca: In rain-green shrub formation, 800 meters, Jaén, *Weberbauer 6192*, type.

14. **PERA** Mutis

Reference: Pax & Hoffm., Pflanzenreich IV. 147. xiii: 1–13. 1919.

Tall shrubs or sometimes trees, the indument often stellate-lepidote or in Peru sometimes simple, the leaves usually alternate, always shortly petioled, entire, pinnately nerved, the ordinarily dioecious sessile flowers subtended by an involucre of 1 or 2 bracts, sometimes the outer flowers female, the central male but commonly the involucres unisexual, with or without floral rudiments. Disk none. Male calyx wanting or valvate, turbinate, stamens 2–5, the filaments sometimes partly connate; ovary rudiment none. Female flowers naked; ovary 3-celled, ovules solitary. Capsules composed of 3 bivalved carpels, the column persisting; seeds carunculate, black, lustrous, smooth.

Leaves distichous; pubescence simple.....*P. distichophylla.*
Leaves opposite or alternate; pubescence lepidote.....*P. benensis.*

Pera benensis Rusby, Descr. N. Sp. S. Amer. Pl. 49. 1920. *P. Mildbraediana* Mansf. Notizbl. Bot. Gart. Berlin 9: 265. 1925.

Tree, the branchlets lustrous, the leaves above glabrous, the latter paler beneath with dense lepidote indument, opposite, oblong-elliptic or oval, rounded to broadly acute at base, slightly apiculate at the obtuse apex, 6–16 cm. long, 3–7 cm. wide; petioles 1–2.5 cm. long, canaliculate above; venation slender; involucres fasciculate at the often defoliate nodes, lepidote, 4 mm. in diameter, peduncles

5 mm. long; rudimentary female flowers with two unequal mostly 2–3-lobed bracts; male calyx wanting, stamens 12–14, filaments 1 mm. long, anthers 1.5 mm. long; fruit to 6 mm. in diameter, pergamaceous, glabrous or sparsely lepidote, the open valves about 1 cm. long, half as wide; seeds 5–6 mm. long, ovoid, slightly compressed, black, lustrous with small light brown strophiole.—This species with notably stout angled and nodose branchlets was compared by both Rusby and Mansfeld with *P. oppositifolia* M. Arg. of Cuba with lepidote branchlets, looser leaf-pubescence and, according to Rusby, much smaller seeds. The Rusby specimen in fruit has smaller leaves matched however by *Krukoff 5710* determined in herbaria *P. glabrata* (Schott) Baill. with alternate glabrate leaves; *P. ferruginea* (Schott) M. Arg., also Brazilian, is similar in pubescence but the leaves are all alternate; possibly the character is not valid as some specimens show lower alternate leaves, upper opposite. In this case the Peruvian specimen may be a variant of *P. ferruginea*. *P. citriodora* Baill., more distinct, has alternate acuminate sparsely lepidote leaves. F.M. Neg. 5374 (*P. Mildbraediana*).

Loreto: Flooded high woods Yarina Cocha, *Tessmann 3406* (type, *P. Mildbraediana*).—Río Acre: Mouth of Río Macauhán, *Krukoff 5627* (det. Steyermark, *P. ferruginea*); *5710* (det. Steyermark, *P. glabrata*). Bolivia.

Pera distichophylla (Mart.) Baill. Etude Gen. Euphorb. 434. 1858; 7. *Spixia distichophylla* Mart. Flora 24, Beibl. 2: 30. 1841.

Branchlet tips early reddish sericeous; petioles 1–5 mm. long, canaliculate, soon glabrate; leaves distichous, lanceolate-elliptic or -ovate, 7–15 cm. long, 2–5 cm. wide, more or less acuminate, often obtusely contracted to petiole or acute, dark above, fuscescent or glaucescent beneath, glabrous, minutely patellate-glandular beneath near midrib, the 5–10 secondary nerves slender; male involucres spicate in axils, the spikes only a cm. long, peduncle 2–4 mm. long, unibracteolate, sericeous tomentose, about 3-flowered, 4–6 mm. in diameter, coriaceous; calyx 1.5–2 mm. long, subentire, densely sericeous with reddish rigid trichomes; stamens 3–5, stamen column accrescent, glabrous above; female flowers and fruit unknown.—Another Amazonian species with simple pubescence that may occur is *P. heterodoxa* M. Arg., 3, the involucre bisexual, bract 1; stellate-lepidote species likely to be found include *P. cinerea* [Poepp.] Baill. 8 (*P. tomentosa* (Benth.) M. Arg.), and *P. citriodora* Baill. 11, the first with male calyx developed, leaves tomentose beneath, the latter

with alternate sparsely lepidote leaves, male calyx none. The Williams specimen from a 15 meter tree with thin rather smooth bark. Illustrated, Pax & Hoffm. l.c. 5. F.M. Neg. 7165.

San Martín: Tarapoto, *Williams 6089?*—Loreto: Yurimaguas, *Poeppig.* Amazonian Brazil.

15. HEVEA Aublet

Reference: Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 2: 217–246. 1935; with bibliography.

Tall lactescent trees with trifoliate alternate leaves on long petioles that are glandular at apex, the entire shortly petiolulate leaflets pinnate-veined and usually membranous. Flowers small, monoecious, apetalous, in paniculate cymes, the central flower of which is often female, the others male, these in bud ovoid or globose, at anthesis 5-dentate or 5-lobed. Disk glands small, 5, free or connate. Stamens 5–10, the filaments connate, anthers sessile, regularly or irregularly 1–2-verticillate, the column extended. Female flowers with 3-celled ovary, ovules solitary, stigma stout, more or less bilobed. Capsule large, splitting into subfleshy (usually) bivalved follicles with large seeds.—The similar *Joannesia* Vell. is weakly distinguished by the larger petaliferous flowers; *J. hevioides* Ducke is the species.

Source (most important) of natural rubber, the genus has received much study, but unless genetic investigations prove to be conclusive the status of its components will not be clearly understood. Ducke, Arquivos Serv. Florestal 2, No. 1: 38. 1943, listed the four most important species, commercially, as *H. brasiliensis*, *H. Benthamiana*, *H. lutea* and *H. guianensis*. While Pax recognized 17 species, Ducke 12 (at most), J. T. Baldwin Jr., Amer. Journ. Bot. 33: 215. 1946, wrote: "there are nine or fewer species characterized by much introgressive hybridization (one could with reason reduce the genus to a single species)." This student considers *H. paludosa* Ule and *H. humilior* Ducke from Iquitos probably representatives of a hybrid swarm of *H. confusa* (i.e. *H. pauciflora* sens. lat.) and *H. guianensis*(?). The following synopsis is prepared from the notably acute and sensible work of Ducke, which, based on many years of field observations and studies in conjunction with consideration of type materials, furnishes a fine example of the methods that must be employed before many groups, at least the more complex, can be interpreted taxonomically with a reasonable degree of usefulness

for all students. His revision, it may be noted, gives the Brazilian native names with English equivalents, l.c. 222–223, mostly not repeated here; he has a supplementary paper detailing distribution and natural hybrids, Arquivos Serv. Florestal 2, No. 1: 25–43. 1943. *Hevea*, according to Seibert, Ann. Mo. Bot. Gard. 35: 117–121. 1948, has been known in cultivation for seventy-one years, trees coming into feasible rubber production only after ten years; the seeds—see remark under *H. pauciflora*—may be a source of economic products.

Leaves dull and usually paler beneath.

Anthers 5(4–8) in a single sometimes irregular verticil, rarely incompletely in 2 verticils; leaves erect; pedicels rarely 4 mm. long; male buds obtuse or barely acuminate. . *H. guianensis.*

Anthers 7–10 in 2 more or less regular verticils; leaves reclinate or semi-erect, if erect, pedicels elongate in part.

Pedicels short; leaves not erect.

Disk of male flowers minute or obscure, their buds acuminate; anthers normally 10 in 2 regular verticils. *H. brasilensis.*

Disk of male flowers well-developed, their buds obtuse or obtusely acuminate; anthers 7–10, the 2 verticils more or less regular.

Male buds obtusely subacuminate; disk glands elongate. *H. humilior.*

Male buds obtuse; disk shortly 5-glandular or -lobate. *H. pauciflora.*

Pedicels of female flowers 5–10 mm. long; leaves erect. *H. paludosa.*

Leaves lustrous both sides, concolored, reclinate to suberect. *H. nitida.*

Hevea brasiliensis (Willd.) M. Arg. Linnaea 34: 204. 1865; 235. *Siphonia brasiliensis* Willd. ex Adr. de Juss. Euphorb. Tent. 40. *pl. 38b, figs. 1–6.* 1824, not *S. brasiliensis* HBK. Nov. Gen. & Sp. 7: 171. 1825. *H. janeirensis* M. Arg. in Mart. Fl. Bras. 11, pt. 2: 706. 1874. *H. brasiliensis* (HBK.) M. Arg. var. *janeirensis* (M. Arg.) Pax, Pflanzenreich IV. 147: 121. 1910.

Gross character of *H. guianensis* but the glabrous membranous acuminate leaflets with duller and as to type paler lower surface and curved downwards instead of erect and, especially, the anthers normally 10 in 2 regular verticils; flowers whitish-yellow, acuminate

in bud as the lanceolate lobes after anthesis; pedicels tomentulose, those of the female flowers longer and maculate above as the calyx-base; ovary typically puberulent with sessile stigmas; capsules rather large with oblong spotted seeds 2.5–3 cm. long.—Var. *Randiana* (Huber) Pax or forma, (Huber) Ducke, l.c. 224 and 236, origin unknown and scarcely in Peru, has more lanceolate leaflets, glabrous smaller ovary; var. *subconcolor* Ducke, Archiv. Jard. Bot. Rio Jan. 6: 55. 1933, or forma, Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 2: 224 and 236. 1935, the leaves nearly equally green both sides, has been collected as near Peru as São Paulo de Olivença and doubtless occurs; var. *acreana* Ule, Bot. Jahrb. 50: Beibl. 114: 14. 1914, "may correspond to the luxuriant individuals which were frequently observed in the fertile soils of Acre territory." (Ducke.) For the cytology of this species see Arquivos Serv. Florestal 2, No. 2: 46.

Synonymy after Schultes, Bot. Mus. Leaflets Harvard 14: 79–86. 1950, who gives a lucid historical summary of the nomenclature together with copies of the analytical plate and photograph of the Paris type of Jussieu. Illustrated, Hook. Icon. 26: *pl. 2573.*

Trees normally 20–30 meters, sometimes 40 meters tall, generally in the forests of recent alluvial soils, inundable or not; is now nearly the sole rubber furnishing *Hevea* and the only one in plantations, its latex exceeding all others in quality and quantity (Ducke). Williams, Field Mus. Bot. 15: 48–49, 274. 1936, gives a good account of rubber collection accompanied by a photograph of this species in cultivation. His collections were from dense lowland but flood-free forests, the cylindric trunks to 3 dm. in diameter, bark pinkish to dark brown, scaly, twigs grayish pubescent.

Loreto: La Victoria, *Williams 2931.* Near Iquitos, *Williams 8071* (?). Pro, *Williams 2003* (det. Seibert). Caballo-Cocha, *Williams 2176* (det. Seibert). Río Itaya, *Williams 206* (det. Seibert). Cerro de Escaler, *Ule 6909.*—Río Acre: Mouth of Río Macauhán, *Krukoff 5468* (hybrid with *guianensis*, var. *lutea*, det. Seibert). Amazonian Bolivia and Brazil. "Siringa," "shiringa legitima," "jebe debil fino" (Williams), "seringuerira branca," "seringueira preta" (Brazil).

Hevea guianensis Aublet, Pl. Guian. 2: 871. 1775; 227. *H. peruviana* Aublet, l.c. 4: *pl. 335. H. lutea* (Spruce) M. Arg. Linnaea 34: 204. 1865. *Siphonia lutea* Spruce ex Benth. in Hook. Journ. Bot. Misc. 6: 370. 1854. *H. peruviana* Lechl. ex Benth. in Benth.

& Hook. f. Gen. Pl. 3: 290. 1880. *H. cuneata* Huber, Bol. Mus. Goeldi 4: 578. 1906.

Typically with glabrous foliage borne in an erect position, very dark green, dense, the older branchlets with persistent scales at the terminal bud, the mature leaflets firm-membranous to thin-coriaceous, commonly obovate, obtuse to rounded, apiculate, about 10 cm. long, petiolules (2) 5–7 mm. long, petioles often 1 dm. long; panicles more or less reddish-tomentulose, early floriferous nearly to base, becoming about as long as the leaves and flowerless below; male buds subglobose, typically obtuse (to acuminate in vars.), the calyx lobed to the middle, about 3 mm. long, disk insignificant, anthers 5 (4–6) ordinarily in one perfect verticil, sometimes with one anther lower, or, in var. *lutea*, verticil irregular; female flowers with sessile stigma or style developed; ovary glabrous or sericeous; capsule deeply divided, 2.5–4 cm. long, the subglobose seeds with brown spots and lines, 17–20 mm. wide, 14–18 mm. thick.—The first described species and highly variable; the most important form is doubtless var. *lutea* (Spruce) Ducke & Schultes, Caldasia 3: 249. 1945, the leaves somewhat, the flower buds distinctly acuminate, and, especially, the anther-verticil irregular, ovary sericeous, stigmas usually not sessile. An apparent form of this with the leaves sometimes lightly pubescent on the nerves beneath has been designated var. *cuneata* (Huber) Ducke, Archiv. Jard. Bot. Rio Jan. 6: 51. 1933 (*H. lutea*, var. *cuneata* Huber, Bull. Soc. Bot. Fr. 49: 48. 1902), or *H. lutea* var. *pilosula* Ducke, l.c. 231, these possibly the same fide Ducke, Arquivos Serv. Florestal 2, No. 1: 21. 1943, or the former var. *occidentalis* Ducke, l.c. 229. 1935, subsp., 223, based on cubical angled seeds with few lines, very large spots; cf. also Ducke, l.c. 229. 1935. *H. peruviana* Lechl. seems to be merely a form of var. *lutea*, the stigmas sessile, this "a very inconstant character." (Ducke.)

Attains 30–40 meters with cylindrical stem, latex yellow; frequent in the upper rain forests. The rubber of the var. *lutea* is said to be better than that of the typical form which hybridizes with *H. pauciflora;* see *H. paludosa.*—Illustrated, Pflanzenreich IV. 147: 127; Archiv. Jard. Bot. Rio Jan. 5: *pl. 18* (seeds). F.M. Negs. 32472; without number (*H. cuneata*); 7101 (var. *lutea*).

Loreto: Cerro de Canchahuaya, (*Huber 1377*, type, var. *cuneata*). Pongo de Manseriche, (*La Rue*, det. Ducke). Yurimaguas, *Killip & Smith 28706* (det. Seibert). Pinto-cocha, Río Nanay, *Williams 818* (det. Seibert var. *lutea*).—Puno: San Gován, (*Lechler*, type,

H. Lechleriana).—Río Acre: Río Macauhán, *Krukoff 5800* (var. *lutea*, det. Seibert). Amazonian region to Dutch Guiana. "Shiringa amarilla," "shiringa del cerro," "seringueira itauba" (Brazil).

Hevea humilior Ducke, Rev. Bot. Appl. Agric. Trop. 9: 624, 629. *pl. 18*. 1929; 237.

A small tree (as to type) with horizontal or reclinate leaves, oblong- or elliptic-obovate leaflets usually 8–12 (15) cm. long, 4–5 (7.5) cm. wide, shortly acuminate, firm-membranous to subcoriaceous, glabrous, soon lustrous above, dull and paler beneath; panicles to 15 cm. long, sparsely pubescent; male pedicels 1–2 mm. long, female twice as long, the buds ovoid, subacuminate or obtuse, sparsely ashy puberulent, at anthesis sepals obtusely acuminate; anthers nearly always 10, in 2 verticils, disk glands elongate-lanceolate; ovary (female flowers) globose, sericeous, stigma subsessile; capsule about size of *H. guianensis* but not so deeply sinuate between the carpels and the spotted lineolate seeds are a little longer in relation to their thickness.—Attains 3–5 meters but not yet known from primary formations (Ducke in 1935). Illustrated, Ducke, Archiv. Jard. Bot. Rio Jan. 5: *pl. 20* (flowers, capsule and seed).

Loreto: Abundant between the low secondary growth near Iquitos at start of route to Morono-cocha (*Ducke 20602*, type); also *Kuhlmann*.

Hevea nitida Mart. ex M. Arg. in Mart. Fl. Bras. 11, pt. 2: 301. 1874. *H. viridis* Huber, Bull. Soc. Bot. Fr. 49: 48. 1902; 238, fide Seibert and Schultes.

Unique in the character of the leaflets which are equally green and lustrous on both surfaces; medium-sized tree, glabrous or the inflorescence lightly pubescent; leaflets finally subcoriaceous, elliptic- or oblong-obovate, shortly acuminate, reclinate or horizontal; flowers nearly like those of *H. pauciflora*, capsule in form like *H. brasiliensis*, not larger than that of *H. guianensis;* seeds angulate-ellipsoid, about 14 mm. long.—Ducke remarks that the leaves of *H. brasiliensis* var. *subconcolor* while nearly green both sides are not lustrous beneath. The presence of interflush short-shoots as well as the glossy under surface of the leaflets leaves little doubt that *H. viridis* should be referred to *H. nitida* (Seibert). Illustrated, Ducke, l.c. *pls. 2* and *3* (flowers, capsules and seed). F.M. Negs. 6631; without number (*H. viridis*).

Loreto: Leche, Pampa del Sacramento, lower Huallaga and Ucayali and, especially, swampy banks of the Río Yanayacu, (*Huber 1534*, type *H. viridis*). Río Nanay, *Williams 889* (det. Seibert). To Amazonian Colombia and Brazil. "Puca shiringa," "shiringa entrefina colorada" (Huber), "urcu shiringa mapa" or "jebe debil muerto" (Williams).

Hevea paludosa Ule, Bot. Jahrb. 35: 666. 1905; 237.

Glabrous except the lightly pubescent inflorescence; petioles shorter than leaflets (in type), petiolules 3–4 mm. long; leaflets obovate-lanceolate, erect, firm-membranous, 7–10 cm. long, 2.5–3 cm. wide, or larger, acuminate, lustrous above, pale and dull beneath; inflorescence about 1.5 dm. long, subglabrous, the slender pedicels 2 mm. long for male flower, 5–10 mm. for female, the buds of the former subacuminate but the apex itself obtuse, the lobes in anthesis obtusely acuminate; anthers 7–10 in two more or less regular verticils but frequently incomplete; disk with small obtuse or acute glands; ovary globose, sericeous, stigmas sessile; capsule 3–3.5 cm. long, 3–4 cm. broad.—This plant has been determined by Seibert as a hybrid between *H. pauciflora* and *H. guianensis* var. *lutea*. According to Ducke it is common at the type locality. Swampy regions outside of flood-area near Iquitos, the type 15–30 meters high. Illustrated, Ule, l.c. 668 (flowers and fruit). F.M. Negs. 5369; 24365.

Loreto: Near Iquitos, *Ule 6260*, type. Mishuyacu near Iquitos, *Klug 128*. Tierra Doble, Río Nanay, *Williams 918* (det. Seibert as noted above). "Jebe debil fino" (Williams).

Hevea pauciflora (Spruce) M. Arg. Linnaea 34: 203. 1865; 238. *Siphonia pauciflora* Spruce ex Benth. in Hook. Journ. Bot. Misc. 6: 370. 1854. *H. membranacea* M. Arg. in Mart. Fl. Bras. 11, pt. 2: 299. 1874.

Glabrous (typically) except for the slightly tomentulose panicles or puberulent flowers, these in bud, at least the male, globose-ovoid and obtuse; leaflets horizontal, suberect or subreclinate, oblong-obovate, obtusely acuminate, often about 8–16 cm. long, 4–8 cm. wide, somewhat lustrous and green above, dull and paler beneath; calyx lobes acuminate, puberulent both sides; disk glands well-developed, bifid or emarginate; male flowers with 10 anthers in 2 verticils; ovary (female flowers) sericeous or glabrous (f. *leiogyne* Ducke), stigmas sessile; capsules large to rather small but the carpels always well-separated. Illustrated, Hook. Icon. *pls. 2574, 2575*.

A rather tall tree rarely used for rubber in the typical state, the leaves membranous even in age, firm in var. *coriacea* Ducke, l.c. 239. Conservatively this could be drawn to include *H. humilior* and *H. paludosa*. Rather allied, apparently, is *H. Benthamiana* M. Arg., 232, that however not yet known from within Peru, the male buds acuminate and usually with only 6–9 anthers, the leaflets pubescent beneath. If *Williams 2503* actually belongs here it records the species as attaining 50 meters or more, trunk over 3 dm. in diameter, bark dark brown, closely fissured, latex turning pink. This and *Klug 812* have been determined by Seibert as a hybrid with *H. brasiliensis*.

The seeds of this species according to Seibert in his important article "Uses of Hevea for Food," Ann. Mo. Bot. Gard. 35: 117–121. 1948, are a potential source of economic products useful to man.

Loreto: Lowland forest, Caballo-Cocha, *Williams 2503*. Mishuyacu near Iquitos, *Klug 812*. Upper Amazonian Brazil. "Siringa" (Williams).

16. RICINUS L.

Reference: Pax & Hoffm., Pflanzenreich IV. 147. ix–xi: 119. 1919.

Flowering as an annual but persisting to become a shrub-tree, the ample peltate leaves palmately lobed, the lobes serrate, and the rather large monoecious flowers in terminal racemes or narrow panicles, the lower male, the upper female; pedicels bibracteolate, the male medially articulate. Stamens a great many, borne on repeatedly branched filaments. Styles 3, united at base, plumose, red. Capsules usually echinate, 3-lobed with 3 conspicuously carunculate black or often beautifully mottled seeds.

The single species, perhaps native to Africa, has long been widely distributed and is one of the first plants known for economic use, greatly varied—see an encyclopedia—but it is most important as the source of castor oil.

In the interior of Peru, as at Mito, the oil of the seeds is used medicinally and collected on water for making candles and "by expression, for lighting, especially for the lamps in the churches." (Ruiz and Pavón.)

Ricinus communis L. Sp. Pl. 1007. 1753; 119.

Herbaceous state often pruinose and purplish, friable; leaves several dm. or even a meter broad, 5–11-lobed, glabrous, glaucous;

male calyx 6–12, female 4–8 mm. long; capsules large, the ellipsoid flattened seeds 9–22 mm. long, 6–15 mm. broad, variously marbled in color.—Many forms have been given taxonomic recognition none probably stable variations but some said to be rated more useful for certain economic qualities.

Huánuco: Mito, established along trails, *1578*.—Loreto: Mishuyacu, clearing, *Klug 1013; 941*. Puerto Arturo, *Williams 5141*. Along Río Itaya, *Williams 234*. La Victoria, *Williams 2886*.—Cuzco: Naturalized in great abundance in the Prov. of Convención (Herrera). —Arica: *Juan Isern*. "Higuerilla," "iguerilla," "castor bean," "castor oil bean," "higuerilla mexicana and de la tierra."

17. PLUKENETIA L.

Reference: Pax & Hoffm., Pflanzenreich IV. 147. ix–xi: 12–16. 1919.

Climbing shrubs with alternate bistipulate ovate usually basally 3-nerved leaves and monoecious apetalous flowers borne in spiciform racemes, the 1–2 female at the base, the remaining male, the calyx of these valvately 4-parted with 12–30 free stamens on a conical receptacle. Female sepals 4. Ovary 4-celled, 4-alate, the styles connate into a cylindric or obovoid column; stigmas short, entire or bilobed. Capsules dehiscing, the cocci carinate, winged or biverrucose, the lentiform or globose seeds ecarunculate.—*Eleutherostigma Lehmanianum* Pax & Hoffm. l.c. 11, monotypic, Colombia and apparently Ecuador, has filiform disk glands half as long as the 40–50 stamens, styles free above the short column, inflorescence paniculate-racemose. Commemorates Leonard Plukenet (1642–1706), English physician and botanist.

Plukenetia volubilis L. Sp. Pl. 1192. 1753; 14. *P. peruviana* M. Arg. Linnaea 34: 157. 1865.

Younger parts puberulent or pubescent, finally glabrate; petioles 2–6 cm. long; leaves ovate, basally broadly cordate, abruptly cuspidate, 7–13 cm. long, 5–10.5 cm. wide, reddish biglandular above at insertion of petiole, not beneath, crenulate or dentate (sometimes very minutely), membranous, puberulent on the nerves; racemes several to 9 cm. long with 1 female flower on pedicel 5 mm. long at base, lower male bracts 6–12-flowered, upper about 5-flowered, the slender pedicels to 3 mm. long; stamens 20–24; female sepals acute, 1.5 mm. long, glabrous as ovary with slender style column 18–25

mm. long; capsules 3.5 cm. wide, 18 mm. high, the 4 cocci dorsally carinate-winged, the lentiform corrugately veined seeds 15 mm. broad.—Illustrated, Pax, l.c. (flowers in part and capsule). F.M. Neg. 7111 (*P. peruviana*).

San Martín: San Roque, *Williams 7731* (det. Mansfeld). Juanjuí, *Klug 3845; 3901* (det. Standley).—Loreto: Mishuyacu, *Klug 634; Killip & Smith 29927* (det. Mansfeld). Iquitos, *Williams 8123* (det. Mansfeld). Florida, *Klug 2056* (det. Standley). Near Mazán, *Mexia 6470* (det. Standley). Yurimaguas, *Poeppig 2210*. Without locality, *Ruiz & Pavón* (type, *P. peruviana*). Bolivia; West Indies. "Sacha Yuchiqui," "sacha yuchi" (both Williams), "amui-o" (Klug, Huitoto).

18. ELAEOPHORA Ducke

Scandent shrubs with long narrow axillary panicles (male) of dioecious apetalous flowers, the female green in short axillary racemes, and entire or subentire petioled leaves. Female calyx with 4 imbricate sepals; receptacle elongating; style column 4(3)-costate with 4 (3) spreading branches at tip. Fruit indehiscent, 4(3)-lobate, fleshy, the very large seeds ecarunculate. Male calyx 4-parted, sepals finally reflexed, the subconic receptacle with many glands mixed between the filaments, in this respect differing from the allied *Plukenetia* and, moreover, with the large seeds of *Omphalea* (Ducke).

Elaeophora polyadenia (M. Arg.) Ducke, Archiv. Jard. Bot. Rio Jan. 5: 146. 1930. *Plukenetia polyadenia* M. Arg. in Mart. Fl. Bras. 11, pt. 2: 334. 1874. *P. macrostyla* Ule, Verh. Bot. Ver. Brandenb. 50: 80. 1908, fide Croizat.

Glabrous; petioles slender, 2.5–3 cm. long; leaves elliptic or ovate, rounded-obtuse or subtruncate at base, abruptly caudate-acuminate, 8–9 cm. long, 4.5–5 cm. wide, entire (or nearly), lustrous, uniglandular (or rarely biglandular) above the base, 5-nerved, firm-membranous; inflorescence axillary, laxly and narrowly paniculiform, naked for 2–3 cm. at base; female flowers with 2.5 mm. long style-column, branches 1 mm. long, ovary 5 mm. long with 4 elliptic wings, 7 mm. wide; cymules 2–3 mm. long, stiped; male buds 2.5 mm. long, acute; receptacle subconic, densely glandular, lobulate; filaments much narrowed apically, about 25, anthers didymous, cells free below, connective produced.—*E. abutaefolia* Ducke, l.c. 4: 112. *pl. 9.* 1925, of Brazil, the type species, seems to be similar but has style columns 3–4 mm. long, branches 2–2.5 mm. long, fruit to 10 cm. long, 11 cm.

wide, glabrous, lustrous, keeled; seeds 5.5 x 4 x 3.5 cm., opaque. See also Ducke, l.c. 5: 146. 1930. Ule separated his species on the basis of 2 leaf-glands and acutish buds.

Loreto: Yurimaguas, *Poeppig 2385*, type. Brazil.

19. APODANDRA Pax & Hoffmann

Reference: Pax & Hoffm., Pflanzenreich IV. 147. ix–xi: 20. 1919.

Habit of *Plukenetia* but leaves always pinnately nerved and, especially, the (12) 15–35 anthers sessile on a globose receptacle, free or more or less confluent. Inflorescences short, unisexual or finally glomerate-spiciform.—Nearly *Fragariopsis* St. Hil. of southern Brazil with indehiscent fruit and could readily be included with it in *Plukenetia* as was the former by Bentham.

Leaves oblong or nearly, the larger about 3 times longer than wide; leaf-nerves 6–7; style column obovoid.....*A. Buchtienii.*

Leaves elliptic-ovate, the larger about twice as long as wide; nerves usually 4–5.

Style column obovoid; stamens 12–15.....*A. brachybotrya.*

Style column cylindric; stamens 15–16.....*A. loretensis.*

Apodandra brachybotrya (M. Arg.) Macbr., comb. nov. *Plukenetia brachybotrya* M. Arg. Linnaea 34: 158. 1865; 16.

Younger parts as the tips of the terete branches early appressed pubescent becoming glabrate as entire plant; petioles 10–15 mm. long; leaves elliptic, usually twice as long as broad, 8–10 cm. long, abruptly cuneately narrowed to petiole, abruptly acuminate, the acumen often short or rounded-obtuse and very acute; minutely denticulate, membranous, brownish biglandular at base; nerves slender; racemes commonly shorter than the petioles, male pedicels longer than calyx, female elongate and even exceeding the male part of the raceme; stamens 12–15; column style obovoid.—Not seen by the monographers. F.M. Neg. 8594.

Huánuco: Chicoplaya, [*Ruiz &*] *Pavón*, type.

Apodandra Buchtienii Pax, Pflanzenreich IV. 147. ix–xi: 21. 1919. *Plukenetia Buchtienii* Pax, Repert. Nov. Sp. 7: 110. 1909.

Simulating *A. loretensis* but leaves lanceolate or oblong, narrowed to base, 6–15 cm. long, 2.5–5 cm. wide, biglandular at base, glandular-

denticulate, chartaceous, secondary nerves 6–7; flowers monoecious, the racemes either unisexual, male 1–3 cm. long, the female 1-flowered, about 1.5 cm. long, or bisexual with 1 female flower at base; pedicels filiform, the male 5–8 mm. long, female to 1.5 cm. long; male sepals 3, orbicular-ovate, acute or obtuse, 2 mm. long; stamens 27–33; female sepals acuminate, scarcely 1 mm. long; ovary wings divergent; style column stoutly obovoid; stigmas indistinct; capsules cruciately 14 mm. wide, half as long, the cocci unitubercled, the laterally compressed seeds 4.5 mm. long, rugulose and slightly granulate, lutescent- and brown-spotted.

Río Acre: Seringal San Francisco, *Ule 9539*, type. Bolivia.

Apodandra loretensis (Ule) Pax & Hoffm., Pflanzenreich IV. 147. ix–xi: 21. 1919. *Plukenetia loretensis* Ule, Verh. Bot. Ver. Brandenb. 50: 81. 1908.

Slender branchlets tardily glabrescent; stipules minute; petioles pubescent, 8–12 mm. long; leaves elliptic or ovate, contracted at base, shortly and obtusely acuminate, mucronulate, 5–6 cm. long, about 3 cm. wide, crenulate, membranous, 2–several glandular above the base, early pilose on the 4–5 arcuate nerves; racemes 1–2 cm. long, all parts pubescent, bracts to 1 mm. long, ovate, acute, the male branches only 2–3-flowered, the pedicels 2–3 mm. long, sepals 4, 1–2 mm. long, elliptic, acute; stamens 15 or 16; female sepals acute, nearly 1 mm. long, thickened at base within margin; ovary pubescent, wings refracted, style column 4 mm. long, pubescent, cylindric, the stigma little broader; capsules unknown.—F.M. Neg. 24572.

Loreto: Near Iquitos, *Ule 6837*, type.

20. MEGALOSTYLIS Sp. Moore

Reference: Pax & Hoffm., Pflanzenreich IV. 147. xiv. Add. VI: 33. 1919.

Shrub probably scandent with alternate ample petioled basally 5-nerved leaves and monoecious apetalous flowers borne in short axillary bracteate cymes. Male calyx closed in bud, valvately 3-parted at anthesis; stamens 6, the filaments connate into a cylindric column, the bicelled anthers didymous; disk and rudimentary ovary none. Female sepals 6, imbricate; disk none; ovary smooth, 3-celled; styles large, clavately connate, entire at tip; ovules solitary.—Fruit unknown. The related *Angostylis longifolia* Benth., 29, of the upper Amazon has the 2–3 male flowers at the nodes, the female solitary

in the axils, stamens about 20 and ovary muricate, the urceolate style column with bifid spreading lobes; perhaps rightly in the same genus are *Astrococcus* Benth. and *Haematostemon* (M. Arg.) Pax & Hoffm., both with racemose flowers, 4 stamens with glandular disk, the glands extrastaminal in the former, intrastaminal in the latter; the leaves of *A. cornutus* Benth. are puberulent on nerves, membranous, of *A. coriaceus* Baillon, glabrous, coriaceous, this *H. coriaceus* (Baill.) Pax & Hoffm., both to be expected.

Megalostylis Poeppigii Sp. Moore, Journ. Bot. 54: 250. *pl. 544, fig. 2.* 1916; 34.

Branchlets as slender petioles, these 2.5–4.5 cm. long, and peduncles sericeous puberulent; leaves broadly ovate, truncate or obscurely cordate, obtuse or sometimes shortly cuspidate, 11 cm. long, 9 cm. wide, often smaller, membranous, sparsely and shortly pubescent both sides, nerves nearly horizontal; cymes 2–2.5 cm. broad, bracts ovate, obtusish, 3–4 mm. long; sepals puberulent, the male oblong-spathulate, obtuse, 2 mm. long, the female little longer, ovate-lanceolate, longer than staminal column; style column 8 mm. long, little curved; ovary globose, sericeous.

Peru(?): Without data, (*Poeppig*, type).

21. TRAGIA [Plumier] L.

Reference: Pax & Hoffm., Pflanzenreich IV. 147. ix–xi: 32–101. 1919.

Herbs often more or less suffrutescent and climbing and usually harsh to touch, with stinging trichomes, the alternate petioled leaves ordinarily more or less cordate at base. Flowers monoecious, apetalous, in axillary or terminal racemes, only a few at base female, all usually solitary in the axils of the persisting bracts. Male calyx valvately 3(–5)-parted, disk glands often obsolete; stamens usually 3 (exceptionally fewer, or 4–20 or 30–50), free; ovary rudiment minute or none. Female calyx 3–6-lobed, the imbricate lobes sometimes pinnate. Ovary 3-celled, the more or less connate styles with entire stigmas. Capsules breaking into 3 bivalved cocci, the globose seeds ecarunculate.

Inflorescence biparted; fruiting pedicels to 8 mm. long, usually shorter.

Stamens 6 with urceolate disk glands; leaves often half as wide as long; female pedicels to 8 mm. long..... *T. fallax.*

Stamens 1–3 with no disk; leaves rarely half as wide as long; fruiting pedicels about 4 mm. long.....*T. subhastata.*

Inflorescence not biparted; fruiting pedicels greatly elongate; stamens 1–3, no disk.....*T. volubilis.*

Tragia fallax M. Arg. Linnaea 34: 179. 1865; 36.

Climbing, the hirsute terete stems tardily glabrescent; stipules about 5 mm. long, acuminate; petioles 2–6 cm. long; leaves ovate or elliptic from a subhastate-cordate base with narrow sinus, acuminate, 7–13 cm. long, 4–7 cm. wide, irregularly dentate, palmately nerved, the nerves early puberulent on both sides; inflorescences opposite leaves, pubescent, biparted, peduncles 2–5 cm. long, male branch 2–6 cm. long, many-flowered, the female 3–7 cm. long, 2–8-flowered; bracts linear-lanceolate, 1 mm. long, the male 1–3-flowered, pedicels 2 mm. long, articulate near base, buds pyriform, opening 2 mm. long or little longer, sepals 3, obovate, hirsute, stamens 6(5–7), disk glands present, filaments apically clavate, rudimentary ovary none; fruiting pedicels to 8 mm. long, sepals 6, lanceolate, acute, hirsute; styles connate to middle, little papillose; capsules 8 mm. thick, 5 mm. long, hirsute; seeds 3 mm. thick.—*T. japurensis* M. Arg., 36, has 3 mm. long bracts, the male branches only 2 cm. long, 9 stamens with filiform filaments, papillose styles; *T. Lessertiana* (Baill.). M. Arg., 37, has 10–20 stamens, leaves acute at base. Determinations by Mansfeld except as noted. F.M. Negs. 7155; 34165.

San Martín: Tarapoto, *Ule 6636; Williams 5558; 6795.* Juanjuí, *Klug 4207* (det. Standley).—Huánuco: Chicoplaya, *Ruiz & Pavón,* type.—Ayacucho: Kimpitiriki, Río Apurímac Valley, *Killip & Smith 22948.*

Tragia subhastata Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 20. *pl. 223.* 1845; 46.

High-climbing liana, the younger stems as the petioles, these 2–5 cm. long, and the young leaves both sides on the nerves puberulent, stipules 3–4 mm. long, acute; leaves oblong-ovate or ovate, acuminate, deeply and acutely cordate at base, 7–13 cm. long, 3–6.5 cm. wide, irregularly dentate, palmately nerved; inflorescence biparted, the female branch 3–6-flowered, the male shorter, fewer flowered; rachis puberulent; bracts lanceolate-ovate; male pedicels articulate above the base and there dilated into a persisting annulus, the female 2–3 mm. long; stamens 3; female sepals ovate, persisting,

unequal; ovary densely fulvous-hirsute; styles shortly connate. F.M. Neg. 32546.

Huánuco: Tocache, *Poeppig 1935*, type.

Tragia volubilis L. Sp. Pl. 980. 1753; 47.

Vine with elongate slender stems, the younger parts somewhat hirsute, the often stinging trichomes more or less persisting especially on the nerves of the more or less dentate leaves, these variable in shape and size but usually oblong-lanceolate from a truncate or more or less openly cordate base, acuminate, several cm. to a dm. long or longer, about 1 cm. to 5 cm. wide or wider; petioles 1–3 (5) cm. long; stipules lanceolate, about 3 mm. long; racemes lateral, slender, 1–several cm. long, the lanceolate bracts persistent, the female flower usually solitary at base on pedicel 4–5 mm. long, much elongating in fruit; male pedicels many, 2–3 mm. long, articulate above the middle; sepals 3; stamens 1–3; filaments short, stout; female sepals 6, persisting; styles more or less connate; capsules 5–7 mm. thick, deeply 3-lobed, setose.—A form with triangular ovate leaves, coarsely serrate-dentate, elongate fruiting peduncle and 2–3 stamens has been designated var. *serra* (Poepp.) M. Arg., a lanceolate subentire leaved form, var. *lanceolata* M. Arg. Illustrated, Pax & Hoffm., l.c.; var. *serra* Poepp. in Poepp. & Endl. 3: *pl. 223*. F.M. Neg. 32547 (var. *serra*).

San Martín: Tarapoto, *Spruce 4850* (type, var. *lanceolata*). Morales, *Williams 5688*.—Loreto: Yurimaguas, *Poeppig* (type, var. *serra*). Widely distributed.

22. ACALYPHA L.

Reference: Pax & Hoffm., Pflanzenreich IV. 147. xvi: 1–177. 1924.

Shrubs, less often trees, sometimes perennial herbs or annual and then especially simulating *Urtica* species. Leaves petioled, alternate, bistipulate, more or less dentate, usually ovate, basally 3–5-nerved or pinnately nerved, frequently scabrous or hyaline puncticulate. Flowers usually monoecious, apetalous, in bisexual or unisexual axillary or terminal inflorescences, if the former the female flowers few at the base. Male flowers glomerulate in axils of small bracts racemosely or spicately disposed as also the female but these usually solitary or 2–4, the bracts often dentate. Disk none. Male calyx valvately 4-parted; stamens generally 8, filaments free, anther cells divaricate or pendulous, rudimentary ovary none. Female

sepals 3–5, imbricate; ovary 3-celled, the 3 free styles commonly lacinulate, ovules solitary. Capsules separating into 3 bivalved cocci, the seeds ecarunculate. The Peruvian species transferred by Kuntze in his Rev. Gen. 2: 615. 1891 to *Ricinocarpus* [Burm.] Kuntze have not been listed, as his action has become only historically significant.

At least as concerns Peruvian species their definition by the monographers is often obscure and it seems probable that there are more names than natural specific units.

Female flowers at least minutely pedicellate; bracts minute.

Leaves palmately nerved, ovate with rounded-subcordate base. *A. villosa.*

Leaves pinnately nerved, lanceolate or oblong-elliptic.

Inflorescence paniculate, sometimes narrowly; petioles mostly or all elongate; leaves more or less acuminate.

Styles 30–40-lacinulate..... *A. platyphylla.*

Styles 10–15-lacinulate..... *A. subandina.*

Inflorescence spiciform; petioles rarely 1 cm. long; leaves narrowly caudate-acuminate..... *A. Macbridei.*

Female flowers sessile; bracts more or less conspicuous.

Herbaceous annuals unless *A. contermina* with androgynous spikes, these in part terminal except in *A. arvensis.*

Bracts minutely multidenticulate; stems puberulent. *A. contermina.*

Bracts laciniate or deeply 3–9-lobed; indument usually somewhat pilose or hirsute.

Bracts not laciniate or setaceous.

Spikes androgynous; leaves ovate or oblong-ovate. *A. Forbesii.*

Spikes male or female; leaves often roundish, basally 3-nerved..... *A. infesta.*

Bracts filiform-laciniate or setaceous-tipped.

Leaves acuminate or caudate; spikes in part terminal.

Bracts laciniate to base; stems eglandular. *A. subcastrata.*

Bracts lobed, long-setaceous; stems glandular. *A. alopecuroides.*

Leaves acutish or acute; spikes all axillary.... *A. arvensis.*

Ligneous plants at least below; spikes not androgynous, or rarely.

Inflorescence in part terminal.

Petioles at least some of them, and soon, much longer than 1 cm.

Female bracts entire or merely glandular below, long-acuminate.

Leaves soon glabrescent beneath, 3-nerved from rounded base; bracts large.....*A. peruviana.*

Leaves pubescent beneath, 5-nerved from cordate base; bracts small.....*A. subbullata.*

Female bracts dentate, the middle tooth sometimes extended (unknown in *A. bullata*).

Leaves conspicuously bullate and reticulate-veined. *A. bullata.*

Leaves obscurely if at all bullate, the lax reticulation rarely prominent; species especially in flower similar.

Leaves glabrous or nearly beneath or scabrous with minute trichomes, sometimes barbate in axils.

Leaf-dentations more or less spreading and distant; bracts 5–6 mm. long in flower, teeth 5–10, the middle extended.....*A. stachyura.*

Leaf-dentations (or leaves crenate) approximate.

Bracts 3–10-dentate, the teeth little unequal. *A. stenoloba.*

Bracts often 9–15-dentate, the middle tooth more or less extended. *A. mapirensis, A. macrodonta.*

Leaves pubescent beneath, if merely puberulent, densely.

Leaf-pubescence minute or rather sparse; bracts unequal, 5–6 mm. long in fruit, 9–15-dentate. *A. mapirensis, A. macrodonta.*

Leaf-pubescence usually dense; bracts often subequal; some specimens seem to merge with above.

Leaves more or less softly puberulent beneath; bracts 3–4 mm. long, typically 5–9-dentate, the middle tooth little longer....*A. benensis.*

Leaves villlous-pilose beneath; bracts 4–6 mm. long, often 12–15-dentate.....*A. stricta.*

Petioles all short, 4–10 mm. long.

Female bract dentations unequal; leaves glabrate.
A. Ruiziana.

Female bract dentations subequal; leaves short villous.
A. padifolia.

Inflorescence all axillary.

Spikes bisexual.

Leaves pinnately nerved, oblong-ovate-lanceolate, often 7–15 cm. long, never subcordate.
A. samydaefolia, A. diversifolia.

Leaves palmately nerved, 3-nerved from base or subtriplinerved, small or more or less cordate.

Leaves not at all cordate, the petioles about 5 mm. long.

Leaves glabrous or nearly.....*A. aronioides.*

Leaves tomentose beneath.....*A. Argomuelleri.*

Leaves at least subcordate on petioles finally about as long; bracts 9–17-dentate.

Leaves obtuse or acute, obscurely cordate; indument little if at all glandular (obscure species).

Bracts 17–multidentate; branchlets eglandular.
A. reflexa.

Bracts 13–15-dentate; branchlets stiped-glandular.
A. brachyclada.

Leaves obviously acuminate, usually cordate.

Leaves openly or rounded cordate; glandulosity lacking or not copious.

Indument dense; leaves dentate.....*A. plicata.*

Indument sparse and fine; leaves crenate.
A. tenuipes.

Leaves deeply cordate with imbricate lobes; glandular indument pungent-resinous.....*A. fulva.*

Spikes unisexual (perhaps abnormal *A. reflexa*).

Leaves pinnately nerved.....(*A. cuneata*), *A. obovata.*

Leaves palmately nerved.

Indument in no part stellate.

Leaves green; petioles often elongate.

Erect shrub or tree; styles short..*A. macrostachya.*

Scandent shrub; styles to 1 cm. long..*A. scandens.*

Leaves red-spotted; petioles short.....*A. Wilkesiana.*

Indument stellulate.....*A. dictyoneura.*

Acalypha alopecuroides Jacq. Icon. Rar. 3: 19. *pl. 620.* 1786–93; 22.

Resembles *A. arvensis;* stem-pubescence at least pilose-glandular; leaves cuspidate- or caudate-acuminate, often more coarsely serrate; spikes terminal and axillary, the former often with a few male flowers at apex; female bracts hispid, 3–5-lobed with long setaceous tips; styles bifid or entire.—A weed like the superficially similar species but apparently much less common.

San Martín: In clearing at Juanjuí, *Klug 4402* (det. Standley, *A. arvensis*).—Loreto: In pasture at Puerto Arturo, Yurimaguas, *Williams 5032.* To Mexico and the West Indies.

Acalypha Argomuelleri Briq. Ann. Cons. Jard. Bot. Genève 4: 229. 1900; 113. *A. buddleifolia* Pax & Hoffm. Pflanzenreich IV. 147. xvi: 113. 1924.

A shrub with divaricate-ascending branches; stipules caducous, setaceous, 2 mm. long; petioles to about 5 mm. long; leaves elongate-elliptic, acutish, obtuse or rounded, 3–4.5 cm. long, 10–15 mm. wide, crenulate, coriaceous, rugulose-bullate, dark green and lustrous above, white tomentose and prominently pinnate-nerved beneath, subtriplinerved at base; spikes axillary, 3–8 cm. long, 1–2 basal bracts female, the latter 3-flowered, 3–6 mm. long, about 20–30-denticulate, reticulate, coriaceous, pilose or tomentose beneath and strongly nerved; sepals acuminate; ovary villous; styles pectinately lacinulate, about 4 mm. long; capsules smooth.—Placed in herb. by Mueller, Argoviensis, near *A. accedens* M. Arg. and *A. Mandoni* M. Arg. (Briquet). Pax and Hoffmann separated their species on the basis of the larger (to 1 cm. broad) female bracts; they described the sepals as oblong, glandular as the ovary but these differences appear to be varietal, if that, and partly due, probably, to age of material. F.M. Negs. 24427; 5282 (*A. buddleifolia*).

Amazonas: Chachapoyas, *Mathews,* type.—Ancash: Huari below Chavin de Huantar in the valley of the River Puccha, *Weberbauer 3737* (type, *A. buddleifolia*).

Acalypha aronioides Pax & Hoffm. Pflanzenreich IV. 147. xvi: 113. 1924. *A. divaricata* M. Arg. Linnaea 34: 34. 1865, not Raf. 1836.

Densely branched shrub, the sometimes virgate or flexuose branchlets as all younger parts puberulent-hirtellous and granular-

glandulose; stipules rigid, acuminate, 2–3 mm. long; petioles to 10 mm. long; leaves ovate-lanceolate, acute both ends or tips subobtuse, 2–3.5 (5) cm. long, 1–1.5 (2) cm. wide, crenate-serrulate, firm-membranous, glabrous above from the first, sparsely pilose on the nerves beneath or nearly glabrous, 3-nerved from base; flowers monoecious; spikes axillary, androgynous, to 1 cm. long, the male part dense, shortly peduncled, one basal female, these bracts 1-flowered, in flower 1 cm. broad, orbicular-reniform, more or less 7–15-dentate-crenate, subglabrous, granular-glandular, sepals ovate, ciliate; ovary hirsute above, slightly glandular; styles about 4 mm. long, connate below, somewhat 10-lacinulate above, 1–3 mm. high.—The type of *A. divaricata* is openly branched, the petioles more slender, the pubescence minute and nearly wanting but otherwise seems to be the same. F.M. Negs. 5278; 7123 (*A. divaricata*).

Ayacucho: Shrubwood, 3,200 meters, Huanta, *Weberbauer 7514* (det. Johnston, sp. nov.). In hedgerows, Ocros, *Stork & Horton 10800* (det. Standley).—Apurímac: Humid rocky places, Curahuasi, *Vargas 9614*. Quisapata, Abancay, *Vargas 8964*. Prov. Andahuaylas, *Vargas 8788*.—Cuzco: Valle de Urubamba, 2,800 meters, *Herrera 2103; 1145; 3348; 3355*. Torontoy, 2,400 meters, *Cook & Gilbert* (det. Ewan). Valley de Lares, *Soukup 45*.—Puno: Between Sandía and Cuyocuyo, 2,100 meters, *Weberbauer 836*, type. Without locality, *Ruiz & Pavón* (type, *A. divaricata*). "Pespita" (Cook & Gilbert).

Acalypha arvensis Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 21. 1845; 99.

Creeping-ascending-erect more or less pilose-hispid annual, the trichomes spreading, those above somewhat yellowish; petioles to 3 cm. long or longer; leaves rhombic-ovate or -lanceolate, obtuse at base, acute, usually 4–6 cm. long, 3–3.5 cm. wide or larger, thin-membranous, basally 5-nerved; spikes androgynous, the upper nearly entirely female, axillary, peduncled, 1.5–2.5 cm. long, 10–13 mm. wide, the slender male part interrupted-spiciform; fruiting bracts about 5 mm. wide, 4–7(9)-parted to middle with filiform-acuminate divisions long-hirsute and glandular as the narrowly ovate sepals; styles lacinulate; capsules to 2 mm. thick, apically pilose, the broadly ovoid seeds about 1 mm. long.—Williams noted the plant as a weed in pastures and chacaras. F.M. Neg. 32497.

Loreto: Yurimaguas, *Poeppig 2115*, type; *Williams 3937; 4267; 4465; 5040*. To Mexico; Bolivia; Martinique.

Acalypha benensis Britton, Bull. Torrey Club 28: 304. 1901; 32. *A. tomentosula* Ule, Verh. Bot. Ver. Brandenb. 50: 79. 1908, ide Pax & Hoffm.

A 1–5-meter shrub, the flexuose branchlets and petioles, these .5–4 cm. long, early velvety tomentulose; leaves oblong or ovate, ounded at or sometimes a little narrowed to the somewhat cordate ase, 5–16 cm. long, 2.5–10 cm. wide, serrate, membranous, finally ubglabrous above, softly pubescent beneath, basally 3–5-nerved, otherwise pinnately; flowers monoecious, the spikes dense, the essile male 4–7 cm. long, the terminal subsessile female about a lm. long, these with truncate bracts 4–5 mm. long, 6 mm. wide, irtellous, 1-flowered, 5–9-lacinulate to one-third, the middle of the arrowly triangular acute lobes a little larger; sepals ovate, acute, iliate; ovary pubescent; styles 7 mm. long, pinnately about 10- acinulate, the lower divisions the smaller; seeds smooth.

San Martín: Tarapoto, *Ule 6637* (type, *A. tomentosula*); *Williams 6027* (det. Standley, *A. mapirensis*); *5658; 5773; 6262; 6688; 6746.* San Roque, *Williams 7003; 7475.* Zepelacio near Moyobamba, *Klug 3347* (det. Croizat, *A. Ruiziana;* Standley, *A. benensis*). Pongo de Cainarachi, *Klug 2611.*—Huánuco: Chinchao to Río Huallaga, *Seibert 2231* (det. A. C. Smith). Tingo María, *Soukup 2119.* Pozuzo, *4621* (det. Johnston).—Junín: Puerto Yessup, *Killip & Smith 26298* (det. Standley).—Loreto: Balsapuerto, *Klug 3100* (det. Standley); *Killip & Smith 28491* (det. Croizat, *A. stachyura*). Above Pongo de Manseriche, *Mexia 6168* (det. Standley). Río Mazán, *José Schunke 22.* Recreo, Yurimaguas, *Williams 3938.*—Cuzco: Rosalina, 650 meters, *Buës.* San Pedro, Prov. Paucartambo, 1,350 meters, *Vargas 6759.* Bolivia. "Yana-barilla" (Mexia).

Acalypha brachyclada M. Arg. in DC. Prodr. 15, pt. 2: 862. 1866; 125.

A shrub with slender terete glabrate branches and short (about 5 cm. long) divaricate apically densely leafy tomentulose branchlets with many axillary spikes; stipules lanceolate-ovate, scariose; petioles 2–4 times shorter than leaf-blades, these 2–3 cm. long, 1–2.5 cm. wide, ovate, cordate at base, acuminate, obtusely serrate, membranous, basally 5–7-nerved, shortly pubescent and glandular as the branchlets and petioles; spikes 2–2.5 cm. long, entirely male or often with 1 female bract at base, this small, 1-flowered, reniform-ovate, 13–15-dentate, the ovate teeth equal; sepals ovate, subacute; ovary glabrous; styles small, rigid, about 5-lacinulate.—

A. soratensis Pax & Hoffm., 126, has somewhat larger leaves softly villous beneath, eglandular. F.M. Neg. 8505.

Peru(?): Without locality, [*Ruiz &*] *Pavón*, type.

Acalypha bullata M. Arg. Linnaea 34: 17. 1865; 66.

Branches stout, rusty tomentose toward tips as petioles, these 2–4 cm. long, and leaves beneath, these ovate, rounded-cordate at base, acuminate or obtuse, 6.5–10 cm. long, 3.5–5 cm. wide, serrulate, the dentations revolutely recurved beneath, subcoriaceous, bullate, sparsely pilose and lustrous above, 5–7-nerved at base; areola convex above, the impressed veins often cruciately quadrate or biquadrately impressed-sulcate; male axillary spikes to 8 cm. long, compressed to 5 mm. wide, dense, erect, sessile; female flowers unknown and therefore also the species relationship.—Supposedly related species but with monoecious flowers include the Ecuadorean *A. tunguraguae* Pax & Hoffm., 66, male spikes slender, lax, the female bracts 5-dentate and *A. subbullata* Pax & Hoffm., origin unknown, the dense male spikes about 4 mm. broad, the female bracts entire except for glandular-denticulate base. F.M. Negs. 5283; 34036.

Peru: Without locality, *Ruiz & Pavón*, type, herb. Boiss.

Acalypha contermina M. Arg. Linnaea 34: 46. 1865; 25.

Branches subherbaceous, puberulent as the petioles (3–6 cm. long) and leaves beneath, these sparsely pubescent or glabrate above, rhombic-ovate or -lanceolate, cuneate to the narrowly cordate base, acuminate, 6–12 cm. long, 2.5–5 cm. wide, serrate, membranous; spikes sessile, slender, 1 dm. long or longer, multibracteate, the terminal and subterminal female at tip with rudimentary male flowers of elongate rigid sterile setae, the other spikes shorter, compressed, 10–13 mm. broad, the male 8–11 cm. long, 2 mm. broad, female bracts 2–3-flowered, finally 8 mm. long, about 9 mm. wide, suborbicular, barely acute, with 13–15 minute ovate densely stipitate glandular teeth; female sepals broadly ovate, acutish; ovary hirsute and papillose-subechinate, the styles above 4–7-lacinulate; seeds 1.5 mm. long.—Possibly from Mexico as most of the closely related species. F.M. Neg. 7141.

Peru(?): Without locality, ex herb. Pavón, type.

Acalypha dictyoneura M. Arg. Linnaea 34: 12. 1865; 160.

Branchlets, petioles, these 5–7 times shorter than leaves, and spikes stellulate puberulent; stipules subulate, 2.5–4 mm. long,

deciduous; leaves ovate, acuminate, cordate or scarcely so, typically about 8 cm. long, 4.5–5 cm. wide, sparsely pilose or glabrate above, densely stellate tomentulose and prominently reticulate beneath, firm-membranous, basally 3-nerved; flowers monoecious, the axillary peduncled dense male spikes often 8–12 cm. long, 3.5 mm. thick, the female 3–5 times shorter (or reduced to one bract) with flowering bracts 1.5 mm. long, broadly ovate, obtuse or acute, 13–17-denticulate, the terminal tooth larger, stipitate, glandular; ovary hirsute; styles 3.5 mm. long, rigid, pectinately 12–15-lacinulate.—"Forma b." *reducta* M. Arg. l.c. 13 seems well enough marked to become more appropriately var. **reducta** (M. Arg.) Macbr., comb. nov., indument more persisting; leaves about 2.5 cm. long, 2 cm. wide, obtuse or scarcely cordate, tip more obtuse; spikes often reduced to one bract. F.M. Neg. 5289.

Amazonas: Chachapoyas, *Matthews*, type. Without locality, *Ruiz & Pavón* (type, var. *reducta*). Ecuador.

Acalypha diversifolia Jacq. Hort. Schoenbr. 2: 63. *pl. 244.* 1797; 107. *A. microgyne* Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 21. 1845.

Slender shrub or tree sometimes attaining 20 meters, the younger branchlets early more or less villous or appressed pubescent as often the leaves beneath or these glabrate; petioles 1–2 (5) cm. long, stipules 5–6 mm. long, linear-setaceous, rigid; leaves ovate to lanceolate, base obtuse or sometimes narrowed to acute or subcordate base, acuminate or cuspidate, often 7–15 cm. long, 2–5 cm. wide or larger, dentate, firm-membranous, 6–9 pinnately nerved; flowers monoecious, the axillary spikes male or androgynous with 1–2 (5) basal female or rarely all female, 5–11 cm. long, 2–4 mm. wide, sessile or nearly, male part dense, later laxly flowered; female bracts ovate, obscurely dentate, 1–3-flowered, small, the fruit 4–6 mm. wide; sepals broadly ovate, acute, hirsute; ovary muricate and hispid; styles about 3 mm. long, pinnately 10–20-lacinulate; capsules nearly 3 mm. thick; seeds 1.5 mm. long, minutely puncticulate.—Plants with villous leaves have been named var. *leptostachya* (HBK.) M. Arg. in DC. Prodr. 15, pt. 2: 854. 1866, and those with glabrate leaves or the nerves pilose, var. *carpinifolia* (Poepp.) M. Arg. l.c. 854. Some of the following material, incomplete, may be misdetermined, especially from Junín, which seems mostly var. *leptostachya* and simulates *A. Ruiziana*, but Diels, Bibl. Bot. 116: 104. 1937, noted leaf-form and pubescence combined otherwise than by Mueller in Ecuador specimens, which he placed here.

San Martín: Tarapoto, *Mathews 1557; Spruce 4033; 4142; Williams 6025; 5490* (det. Mansfeld, *A. samydaefolia*). San Roque, *Williams 7059*. Zepelacio, *Klug 3369; 3751* (det. Standley). Juanjuí, *Klug 3791* (det. Standley).—Huánuco: Pozuzo, *4564* (det. Johnston). Cuchero, *Poeppig* (type, *A. microgyna*). Monzón, *Weberbauer 3428*. —Junín: La Merced, *5311* (det. Johnston); *Killip & Smith 23742; 23533; 24080*. San Ramón, *Schunke 115; 165; 276; Killip & Smith 24549; 24740*. Colonia Perené, *Killip & Smith 25052; 25217*. Pichis Trail, *Killip & Smith 25887*.—Loreto: Lower Huallaga, *Williams 4391; 4756*. Yurimaguas, *Williams 4470; Killip & Smith 27663; 28063; 28216*. Puerto Arturo, *Killip & Smith 27712; 27897*. La Victoria, *Williams 2826*. Mexico to Bolivia, Brazil and Venezuela; Guiana. "Yana-varilla" (Williams).

Acalypha Forbesii Sp. Moore, Journ. Bot. 52: 336. 1914; 26.

Stems early densely white pubescent as the petioles, these slender, about 12 mm. long, and the leaves beneath especially on the nerves; leaves ovate, rounded at base, obtuse, often shortly 3-lobed, about 3 cm. long, 2 cm. wide, crenate, membranous, sparsely strigillose above; spikes terminal and axillary, all androgynous, subsessile, the terminal about 4 cm. long, 8–9 mm. broad, the male part scarcely 3 mm. long, deflexing, the densely bracted female portion oblong; axillary spikes about 12 mm. long; female bracts becoming 5–6 mm. broad, 3–5-lobed medially or a little deeper, the lanceolate-oblong obtuse lobes entire or unidentate, membranous, pubescent without; ovary shortly hispidulous, styles few-lacinulate, not colored; capsules trilobed, about 2 mm. in diameter, the seeds 1 mm. long.—The related and widely distributed (at least as a weed) *A. Poiretii* Spreng., for which the proper name may be *A. alnifolia* Poir., has larger leaves, slender spikes and simple styles; the similar but like *A. Forbesii* imperfectly known *A. paupercula* Pax & Hoffm., 29, of Bolivia is ligneous at base, has female part of spikes ovoid, the bracts 5–9-dentate, or spikes all male, ovary long-pilose. *A. boliviensis* M. Arg. has the male spikes axillary at base of the terminal female, styles simple or 3–4-parted.

Lima(?): Valley between Pacasmayo and Railhead, (*Forbes*, type).

Acalypha fulva Johnst. Contr. Gray Herb. 75: 29. 1925.

Pungently resinous shrub about 5 dm. tall, the bracts, petioles, these 5–15 cm. long, and leaf-nerves beneath villous-hirsute with

more or less glandular simple setae, these sometimes 2–3 mm. long; stipules reflexed, persisting, lanceolate-subulate, subscarious, glabrate, 6–8 mm. long; leaves ovate-acuminate, deeply cordate at base with imbricate lobes, 12–36 cm. long, 9–18 cm. wide, green, villous, sparsely stipitate glandular and inconspicuously punctate above, serrate; male spikes axillary, 6–15 cm. long, glandular pubescent, about 1 cm. above base with 1 or 2 cordate-ovate sessile 1-flowered female bracts 20–30-dentate, 10–12 mm. long, 11–16 mm. wide; female sepals oblong-ovate, glandular-ciliate; ovary densely stipitate glandular; styles 7–9 mm. long, deeply 10–15-lacinulate.—Belongs to group Olygogynae-Cuspidatae, 114, but according to Johnston readily separated from other members of this section by the glandular pubescence and deeply cordate leaves with closed sinus, and thus allied to *A. plicata* and *A. reflexa* within Peru.

Huánuco: Muña, 2,000 meters, *4011*, type.

Acalypha infesta Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 22. 1845; 48.

Annual or perhaps sometimes perennial, the branching stems to 5 cm. high, puberulent or above hirsute with retrorse trichomes as the 0.5–3 cm. long petioles; leaves broadly ovate, rounded, obtuse or slightly cordate at base, obtusish, 2–5 cm. long, 1.5–4 cm. wide, crenate-serrate, thin-membranous, early sparsely pilose, basally 3-nerved; flowers monoecious, the male spikes axillary, shorter than the petioles, the female terminal and 1–several in the leaf-axils, the former in fruit to 4 cm. long, 1.5 cm. broad, hirsute, the bracts then 6–8 mm. long, 3–5-lobed at least medially, the oblong lobes obtuse or acute, the terminal sometimes smaller, shortly hirsute, ciliate, often glandular, 2-flowered; sepals ovate, acute, ciliate; ovary apically hirsute, muricate or nearly smooth; styles 2–4 mm. long, slenderly 2–5-lacinulate; seeds about 1 mm. long, minutely puncticulate.—Name written *infestans* by Mueller, Linnaea 34: 23. 1865. The var. *rotundifolia* (Vahl ex Baill.) M. Arg. is the form with lobes of female bracts rounded-obtuse, eglandular, var. *stenoloba* M. Arg. (typical form), the bract lobes sometimes acute, always glandular-ciliate. A weedy annual sometimes rooting at the often decumbent-ascending base. The Ecuadorean *A. stellipila* Pax & Hoffm., 49, said to be related, seems to be recognizable at once by the stellate pubescence and shrubby habit. F.M. Negs. 32501; 5295 (var.).

Lima: Matucana, sandy gravel along river, *319* (det. Johnston).—Huánuco: Near Cuchero, *Poeppig 1701* type (and type var. *stenoloba*).

—Junín: La Merced, ditch bank, *5286* (det. Johnston).—Apurímac: Oropeza Valley, *Vargas 9785* (det. Standley). Casinchihua, Prov. Abancay, *Goodspeed Exped. 10583* (det. Standley). Without locality, *Ruiz & Pavón; Dombey.* Ecuador.

Acalypha Macbridei Johnst. Contr. Gray Herb. 75: 28. 1925.

Branchlets terete, the younger as the petioles, these 5–8 mm. long, densely canescent strigose; stipules lanceolate, deciduous, about 2 mm. long; leaves broadly oblanceolate or oblong-lanceolate, obtuse at base, attenuate-acuminate, 15–27 cm. long, 2.5–5.5 cm. wide, membranous, obsoletely crenate, asperulous above, sparsely appressed villous and paler beneath with the 15–25 primary veins prominent; male racemes unknown; female axillary, filiform, 8–16 cm. long, spiciform (but the flowers scattered), shortly peduncled, strigose; bracts minute, ovate-lanceolate, 1–3-flowered, the flowers scarcely 1 mm. long; pedicels slender; sepals 5, ovate, acute, glandular-dentate; ovary densely papillose; styles about 2.5 mm. long, 15–20-lacinulate.—Apparently nearest *A. subandina* Ule with longer petioles and paniculate inflorescence (Johnston) and the almost filiform caudation is sometimes nearly 3 cm. long. Type from a lax shrub about 9 dm. high; arborescent, 5 meters high (Mexia). *A. salicifolia* M. Arg., 19, of Ecuador has linear-lanceolate leaves, 12 cm. long, 12–18 mm. wide, minutely puberulent beneath only on nerves, female pedicels 1.5 mm. long; otherwise seemingly similar but male flowers unknown.

Junín: La Merced, *Killip & Smith 23525.* Pichis Trail, *Killip & Smith 25428.*—Huánuco: Pampayacu, *5093*, type.—Loreto: Above Pongo de Manseriche in tangle on steep banks, *Mexia 6213* (det. Standley).

Acalypha macrodonta M. Arg. Linnaea 34: 51.1865; 85.

Tall shrub, the branches and leaves beneath sparsely pubescent; petioles early short, soon 1–4 cm. long; leaves ovate, lightly cordate, acuminate, 6–12 cm. long, about half as wide, or larger, coriaceous-membranous, serrate; flowers dioecious, the male unknown; terminal sessile female spikes dense, shorter than the leaves, the ovate-lanceolate 1-flowered bracts 5–7-dentate both sides below the tip, this tooth or terminal part 3–4 times longer than the rest, sparsely stipitate glandular; sepals ovate, long-acuminate; ovary hirsute; styles elongate, shortly 10–12-lacinulate their entire length with 2–3-parted laciniae, sparsely pilose.—*A. stellipila* Pax & Hoffm.,

49, of Ecuador with the pubescence of *A. dictyoneura*, that however apparently with axillary inflorescence, would be sought here. When the type of *A. macrodonta* can be re-examined it may prove to be the correct name for *A. mapirensis;* compare also *A. Lechleri* noted under the latter. F.M. Neg. 8501.

Ayacucho: Río Apurímac Valley near Kimpitiriki, *Killip & Smith 22947* (det. in herb. *A. macrophylla*, i.e. *A. stachyura*). Peru(?): *Pavón*, without other date, type, herb. Delessert (Boissier).

Acalypha macrostachya Jacq. Hort. Schoenbr. 2: 63. *pl. 245.* 1797; 144. *A. sidaefolia* HBK. Nov. Gen. & Sp. 2: 95. 1817. *A. macrophylla* HBK. ex Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 22. 1845. *A. tarapotensis* M. Arg. in DC. Prodr. 15, pt. 2: 808. 1866. *A. tristis* Poepp. in Poepp. & Endl. l.c.

A tall shrub or slender tree rarely attaining 12 meters, the stout branchlets and leaves hirsute-villous in varying degree to nearly glabrous; stipules basally cordate, obtuse, linear-lanceolate, glandular, 1–1.5 cm. long, persistent; petioles 5–20 cm. long or longer; leaves ovate, often broadly, obtuse or cordate at base, acuminate, usually a dm. or two long, 6–17 cm. wide, serrate, membranous, palmately nerved; flowers apparently monoecious in long (sometimes 4 dm.) axillary sessile or shortly peduncled spikes, the male dense, to 5 mm. wide, the rather laxly flowered female sometimes with a few male at tip or sometimes the upper half male; female bracts broadly ovate or truncate-obtuse, 13–27-dentate, one-fifth to one-third incised, 1-flowered, the teeth acuminate, frequently gland-tipped, the fruiting 5–7 mm. long; sepals broadly ovate, acute, glandular; ovary hispid; styles 4–5 mm. long, subpinnately 10–20-lacinulate, dorsally pilose; capsules nearly 4 mm. thick, pilose, the puncticulate seeds 2 mm. long.—Herbarium materials have been sorted into three variants according to pubescence: *hirsutissima* (Willd.) M. Arg., *macrophylla* (HBK.) M. Arg. (this with leaves glabrate except nerves), and *tristis* (Poepp.) M. Arg., entirely glabrate except for apical puberulence. Since, apparently, these are not geographically distinct, the sorting appears to be entirely artificial. The last two were treated as formas by Mueller Argoviensis in DeCandolle's Prodromus, l.c. 810–811. The similar more northern *A. heterodonta* M. Arg., 146, has ovate leaves, styles about 7 mm. long and is probably a subspecies. F.M. Neg. 7134 (*S. tarapotensis*).

Huánuco: Huamalíes, *Weberbauer 3614;* 286 (cf. *A. tarapotensis*). Cuchero, *Ruiz & Pavón; Poeppig* (det. Poeppig, *A. sidaefolia*).

Pampayacu, mouth of Río Chinchao, *5025* (det. Johnston). Tingo María, *Soukup 2119* (det. Croizat).—San Martín: Tarapoto, *Spruce 4294* (type, *A. tarapotensis*); *Williams 6313; 6765.* San Roque, *Williams 7704.* Zepelacio near Moyobamba, *Klug 3365* (det. Standley).—Junín: Chanchamayo Valley, *Schunke 426; 486; Isern 2132.* Hacienda Schunke, *Schunke A109.* La Merced, *Killip & Smith 23405; 23441.* Near Perené Bridge, *Killip & Smith 25398* (var. *tristis*, det. Mansfeld).—Loreto: La Victoria, *Williams 2822.* Yurimaguas, *Williams 3912; 4838* (var. *tristis*, det. Mansfeld); *Poeppig 2192; 3088* (type, *A. tristis*). Puerto Arturo, *Killip & Smith 27756; Williams 5124.* Pucallpa, *Soukup 3050.* Iquitos and Mishuyacu, *Williams 8055; Klug 1464.*—Cuzco: Valle del Urubamba, Machu-picchu, 2,200 meters, *Herrera 3228; 3237; 3242* (all det. Standley). Potrero, Río Chuyapi, *Vargas 8249.* Cadena, *Vargas 6125.*—Río Acre: Seringal Auristella, *Ule 6536.*

Guianas to Mexico, Bolivia and Brazil. "Yana-vara" or "varilla" (Williams), "pespita" (Herrera).

Acalypha mapirensis Pax, Repert. Nov. Sp. 7: 110. 1909; 65.

Branchlets shortly pubescent apically becoming glabrate as the petioles, these 3–13 cm. long; leaves broadly ovate or oblong, rounded-cordate or obtuse at base, acuminate, 12–25 cm. long, 5–15 cm. wide, serrate-dentate, membranous, early sparsely pubescent especially beneath on the nerves, the basal 3–5; flowers monoecious, the dense spikes sessile or shortly peduncled, the axillary male 3–6 cm. long, 2–3 mm. thick, the terminal female in flower 8–15 cm. long, tomentose, their bracts about 6–7 mm. broad, strongly nerved, 1-flowered, slightly if at all glandular, one-fourth or one-third 9–15-dentate, teeth linear, the medial often 2–3 times longer than the others; sepals ovate, acuminate; ovary verrucose, pilose; styles 5–10 mm. long, shortly and finely 6–15-lacinulate; capsules pilose; seeds subglobose, 1 mm. thick, nearly smooth.—Var. *pubescens* Pax & Hoffm. and var. *scabra* Pax & Hoffm. designate two types of leaf-pubescence, the former the typical. Compare *A. macrodonta*, probably the earlier name. *A. Lechleri* Britton, 65 (type, *Lechler 2408* without data), Bolivian or possibly from Peru may belong here but the flowers are described as dioecious with styles only 2 mm. long. F.M. Neg. 5301.

Cuzco: Prov. Quispicanchi, 800 meters, *Marín 1551.*—Puno: Chunchusmayo, Sandía, *Weberbauer 1174* (var. *scabra*).—Río Acre: Seringal San Francisco, *Ule 9535; 9535b* (last, var. *scabra*). Mouth of Río Macauhán, *Krukoff 5440* (det. Steyermark). Bolivia.

Acalypha obovata Benth. Bot. Voy. Sulphur 163. *pl. 53*. 1844; 163. *A. cuneata* Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 22. 1845; 163.

Tall glabrous shrub or the branchlets and leaves beneath on the nerves more or less hirtellous; stipules lanceolate-subulate with thick midnerve, 7–9 mm. long; petioles 1–4 cm. long; leaves oblong-obovate, long-cuneate to the slightly cordate base, more or less abruptly caudate-acuminate, often narrowly, cuspidate and mucronulate, 1–2.5 dm. long, or longer, 3–9 cm. wide, firm-membranous, crenate or callous-denticulate except toward base; flowers monoecious in sessile axillary dense elongate spikes, the upper female, the lower male, these 12–15 cm. long; fruiting bracts broadly reniform, nearly 5 mm. wide, apically subrecurved, acute, slightly 11–15-denticulate (apparently also fewer), 1-flowered; sepals broadly ovate, acuminate; ovary hispid and very muricate; styles rigid with about 20 laciniae entire length, dorsally pilose and asperous; capsules 6 mm. broad; seeds smooth.—*A. juruana* Ule seems near but the female bracts are 7–9-denticulate, petioles 4–10 cm. long and to it was referred a collection by Rospigliosi accredited to "Lima" which must have been obtained on the eastern side of the Andes. The common form seems to be var. *cuneata* (Poepp.) Macbr., Candollea 8: 26. 1940, according to Mueller the glabrous state, but I have not seen Bentham's type. Common in the region of Iquitos, only a few collections cited. *Krukoff 5249* has been referred here, but female bracts not seen. F.M. Neg. 5288.

Huánuco: Río Cayumba, *Mexia 8269* (det. Steyermark).—Loreto: Yurimaguas, *Poeppig*, type (numbered *2230; 2317; 2807*); *Killip & Smith 28195; Williams 3866*. Puerto Arturo, *Williams 5134*. Fortaleza, *Williams 4271*. Lower Huallaga, *Williams 5134*. Santa Rosa, *Killip & Smith 28888; 28859*. Iquitos, *Klug 1400*. San Antonio, Río Itaya, *Killip & Smith 29438*. La Victoria, *Williams 2767*.—Río Acre: Mouth of Río Macauhán, *Krukoff 5249*. To Venezuela and Colombia. "Sapote yacu" (Williams).

Acalypha padifolia HBK. Nov. Gen. & Sp. 2: 97. 1817; 62.

Shrub-tree to about 4 meters high, the terete branchlets, petioles (4–10 mm. long), leaves beneath and male spikes more or less villous-tomentose; leaves lanceolate-ovate, obtuse and slightly cordate at base, acute, 4–8 cm. long, 1.5–3.5 cm. wide, firm-membranous, serrations recurved, sparsely pubescent and scabrous above, 3-nerved; flowers monoecious, the known axillary male spikes 8 cm. long,

slender, laxly flowered, the fruiting terminal 5–6 cm. long, compressed 12 mm. broad, dense, the suborbicular bracts acute or acuminate in fruit, about 12 mm. wide, 1-flowered, strongly nerved, stipitate-glandular beneath and marginally, 17–19-dentate, the triangular acute teeth recurved; sepals ovate, acute, ciliate; ovary hirsute; styles 7–8 mm. long, pilose, pectinately 10–16-lacinulate.—*A. Schimpfii* Diels, Bibl. Bot. 116: 103. 1937, of Ecuador has bracts about 12-dentate but otherwise ex char. seems to be similar, as also *A. eugeniifolia* Rusby, 62, of northern Bolivia, but the bracts 7–8-parted. There seem to be connecting Ecuadorean forms or species: *A. andina* M. Arg. and *A. ecuadorica* Pax & Hoffm. both with membranous leaves, the former more pubescent, rounded-cordate at base, the latter obtuse or acute, the female bracts stiped-glandular. There is further *A. tunguraguae* Pax & Hoffm., scarcely distinguishable unless the leaves somewhat bullate above, more pubescent, the petioles 1–3 cm. long, and *A. controversa* (Ktze.) K. Schum., 68, type from Bolivia, which is apparently a large-bracted species comparable to *A. peruviana* but pubescent. My collection is very young, the bracts not clearly dentate below but undeveloped; as the leaves are densely villous-tomentose beneath it could be *A. andina* or maybe *A. tunguraguae* if these are specifically distinct. As remarked by Diels, Bibl. Bot. 116: 103. 1937, the species definition in this group is not yet determined; maybe *A. padifolia* is a basic unit with the central acumination of the female bracts not produced, as more or less in the following material. My specimen was from an open shrub, 1 meter tall; Stork and Horton from trees or shrubs 5 meters tall with cane-like stems forming a tangle with each other and other shrubs.

Cajamarca: Above Socota, 2,800 meters, *Stork & Horton 10148* (det. Standley, *A. controversa*).—Junín: Huacapistana, *5824* (det. Johnston, *A. controversa*).—Loreto: Río Marañón Valley, *Dennis 29132* (det. Croizat, with query). Ecuador.

Acalypha peruviana M. Arg. Linnaea 34: 17. 1865; 68.

Branches ligneous, the younger parts densely appressed pubescent with pale fulvous trichomes, the branchlets and leaves soon glabrous; petioles 2–6 cm. long; leaves broadly ovate, obtuse at base, acuminate, 9–17 cm. long, 4–12 cm. wide, serrulate except toward sub-5-nerved base, chartaceous; secondary nerves with veins prominent both sides; sessile or subsessile axillary male spikes 6–18 cm. long, dense, about 3 mm. broad, the terminal peduncled fruiting ones

nearly equaling the leaves and the bracts unusually large, said to attain 2 cm., 8 mm. wide, ovate, acuminate, entire but (except at tip) densely glandular pilose toward and on margins; sepals broadly ovate, acuminate, ciliate; ovary shortly pilose; styles 4–5 mm. long, shortly many-lacinulate; fruit unknown.—There are several similar Bolivian species or variants, some with tomentose leaves as *A. controversa* (Ktze.) K. Schum. and more or less dentate, glandular or eglandular but large bracts; cf. *A. padifolia*. F.M. Neg. 5308.

Huánuco: Compact tree-shrub with spreading branchlets, Muña, *4029; Ruiz & Pavón*, type.

Acalypha platyphylla M. Arg. Linnaea 34: 6. 1865; 20.

Shrub with angled early appressed puberulent branchlets, this indument also on the 9–13 nerves of the younger leaves; stipules subulate; petioles 2–several cm. long; leaves elliptic-lanceolate, obtuse at base, 17–20 cm. long, 7–9 cm. wide, obtusely crenate-dentate, rigid-membranous, paler beneath; female panicles axillary, ample, erect, laxly flowered, finally equaling the leaves, the small oblong-ovate acuminate bracts 1–3-flowered, the flowering pedicels equaling the calyx, in fruit 7 mm. long, the 5 ovate-lanceolate sepals acuminate; ovary minutely muricate-subhirtellous; styles 2–2.5 mm. long, divergently 30–40-lacinulate from the narrowly lanceolate base, the short laciniae subgeminate or ternate.—A Colombian specimen thought to belong here but entirely male has slender subsessile densely flowered spikes 5–15 cm. long (Pax and Hoffmann); see also *A. subandina*. F.M. Negs. 7135; 32505.

Peru (probably). Ecuador; Colombia?

Acalypha plicata M. Arg. in DC. Prodr. 15, pt. 2: 855. 1866; 121. *A. flabellifera* Rusby, Mem. Torrey Club 6: 119. 1896? *A. cordifolia* Griseb. Goett. Abh. 24: 59. 1879, not Hook. f. Trans. Linn. Soc. 20: 186. 1847.

Densely leafy flexuose branchlets obscurely glandular pubescent with short trichomes, glabrescent in age; stipules linear, subulate-acuminate, membranous; petioles 1.5–2.5 cm. long, densely pilose as the leaf-margins and female bracts with gland-tipped trichomes; leaves oblong-triangular-ovate, rounded-cordate at base, long-acuminate, 6–8.5 (15) cm. long, 3–4.5 (10) cm. wide or becoming larger, 5-plinerved, firm-membranous, denticulate, paler beneath, the younger villous-sericeous, the trichomes above in part rigid, beneath

sometimes entirely subpulveraceous asperous with enlarged trichomes; spikes elongate, finally as long as or longer than the leaves (male part 2.75 mm. wide), a naked area between the female and male bracts, the former basal, 1-flowered, broadly reniform, obtuse, typically entire with prominently plicate nerves, fruiting to 14 mm. wide, 8 mm. long, cyathiform-obconic, subtruncate, glandular; female calyx segments broadly ovate; ovary pilose and slightly muricate above; styles shortly 5–7-lacinulate; seeds 2 mm. long.—Habit of *A. cuspidata* Jacq., 120, which reaches southern Ecuador from the West Indies and perhaps is only a more glandular state. Lourteig & O'Donell, Lilloa 8: 312. 1942, regard the plant of Rusby (that is Grisebach, not Hooker, f.) as distinct, the female bracts minutely many-denticulate; Pax and Hoffmann questioned the identity. The problem of course (curiously ignored) concerns the validity of bract-dentation and glandulosity as indicators of species or variants, as varieties or subspecies. Incidentally, in some moment of aberration, surely no less, I created the superfluous name *A. Hookeri*, Field Mus. Bot. 11: 26. 1931, for the earlier described plant of Hooker, f.

Cuzco: Quillabamba to Echarate, *Vargas 7530*. Near Cuzco, *Vargas 1713* (det. Croizat). Potrero, Río Chuyapi, *Vargas 8248*. To Paraguay and Argentina.

Acalypha reflexa M. Arg. Linnaea 34: 33. 1865; 123.

Branchlets many, fulvous villosulous as the petioles, these finally nearly as long as the orbicular to elliptic or ovate blades of the membranous leaves, these subcordate at base, rounded to the obtuse or acutish apex, 3.5–7 cm. long, 3–5 cm. wide, the marginal dentations oblique and subconcave dorsally below the tips; stipules 6–7 mm. long, subulate-acuminate, margins hyaline, stipitate-glandular; male spikes 4–6 cm. long, dense or below interruptedly glomerulate; female flowers 1–2, the broadly ovate bracts cordate at base, rounded-obtuse, 6 mm. long, about 25-dentate (teeth refracted), villous without, pilose within, radiately more or less plicate, 1-flowered; sepals ovate, acuminate; ovary fulvous sericeous; styles rigid, short, pectinately about 16 lacinulate.—Female inflorescence probably not normal (M. Arg.). F.M. Neg. 7144.

Peru(?): Without locality, *Ruiz & Pavón*, type, herb. Boiss.

Acalypha Ruiziana M. Arg. Linnaea 34: 16. 1865; 67.

Ligneous branches lenticellate, fulvous-villosulous apically; petioles to 5 mm. long; leaves lanceolate or oblong-ovate, base

narrowly obtuse or acute, acuminate, 2.5–4.5 (14) cm. long, 12–20 mm. (or 3–5.5 cm.) wide, coriaceous, opaque, pubescent only on pinnate nerves, these impressed above, prominent beneath (3-nerved at base), glabrescent, dentations early revolute beneath; axillary male spikes 5–12 cm. long, 4 mm. wide, compressed, sessile finally laxly flowered; sessile or subsessile terminal female spikes 2–4 cm. long, the congested flowering bracts 2–3 mm. long, in type 5–9-dentate both margins, long-acuminate, the acumen twice as long as triangular basal part, entire or few-glandular, sparsely hirsute, 1-flowered; sepals oblong, exceeding pubescent ovary, pubescent and few-glandular; styles rather rigid, pectinately 12–15-lacinulate.—The incompletely known *A. carthagenensis* Jacq., 67, of Colombia may prove to be the earlier name but scarcely on account of the separation in range. The larger leaf-measurements apply to the specimen of Soukup. F.M. Neg. 5316.

Huánuco: Muña, *Ruiz & Pavón*, type.—Junín: Vitoc, *Soukup 2448*. Chanchamayo, *Isern 2388*.

Acalypha samydaefolia Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 21. *pl. 224*. 1845; 107.

Shrub sometimes 10 meters high, the slender branchlets and petioles, these 3–15 mm. long, early appressed pubescent; stipules linear-setaceous, rigid, 5–7 mm. long; leaves lanceolate or ovate, obtuse at 3-nerved base, narrowly cuspidate-acuminate and mucronate, 4–14 cm. long, 2–6 cm. wide, lightly serrate, firm-membranous, glabrous above, glabrous or sparsely pilose on the 5–7 nerves beneath; flowers monoecious, the slender sessile axillary spikes 2–3.5 (rarely to 10) cm. long, entirely male or 1–4 female bracts at base or these solitary in the leaf-axils, about 4 mm. broad, orbicular-reniform, rotund or shortly acute, shortly and obtusely about 12-dentate, coriaceous, 1–2-flowered; female sepals ovate, acute, ciliate; ovary densely muricate and pilose; styles about 2 mm. long, subpalmately to 10-lacinulate at base; capsules 3 mm. broad, seeds said to be smooth.—Not clearly distinct from *A. diversifolia* unless the seeds are smooth. It is noteworthy that the authors described the female bracts as denticulate while according to Pax and Hoffmann they are entire; I doubt that the species is distinct from *A. diversifolia*. F.M. Neg. 5318.

Loreto: Yurimaguas, *Poeppig 2122*, type; *Spruce 3910* (det. Pax).—Río Acre: Seringal San Francisco, *Ule 9532* (det. Pax). Southern Brazil to Venezuela and Colombia.

Acalypha scandens Benth. in Hook. Journ. Bot. Misc. 6: 329. 1854; 147.

High climbing, the tips of the lightly angled branches often densely fulvous-hirsute with more or less spreading trichomes or these sometimes appressed or soon deciduous; stipules narrowly lanceolate, acuminate, typically glandular, 6–8 mm. long; petioles 2–10 cm. long; leaves elliptic-ovate but as interpreted here variable, rounded-cordate to acute at base, apiculate to well acuminate, 8–16 cm. long, 5–9 cm. wide or smaller, especially narrower, coarsely serrate to subentire, membranous, basally 5-nerved, rather harshly scabrous-hirsute above, ordinarily glabrate or scabrous-punctate beneath; flowers monoecious, the shortly peduncled early densely flowered male spikes to 2 dm. long, the female to 3.5 (10) dm. long, lax, slender, sometimes with a few male flowers at tip and always conspicuous after anthesis by the coral-red styles about 1 cm. long with many entire or parted lacinulae; fruiting bracts to 3.5 mm. long, ovate, hirsute, 11–19-dentate to the middle (or shortly in Peru) with linear gland-tipped teeth; ovary strigose and muricate; capsules nearly 3 mm. in diameter; seeds smooth, 2 mm. long.—Some of the material cited has glabrous shortly dentate bracts and may not belong here. F.M. Neg. 5317.

Huánuco: Tingo María, *Stork & Horton 9475* (det. Standley).—Loreto: Fundo Indiana near Río Marañón, *Mexia 6386* (det. Standley). Río Mazán, *José Schunke 22* (det. Croizat with query). Yurimaguas, *Williams 4521*. Mishuyacu, *Klug 1070* (det. Mansfeld). Río Itaya above Iquitos, *Killip & Smith 29541*. Leticia, *Williams 3170*. Lower Río Nanay, *Williams 591* (leaves oblong-lanceolate, about 10 x 3 cm., det. Mansfeld). Caballo-Cocha, *Williams 2311; 2179*. Balsapuerto, *Killip & Smith 28491*. To the Guianas.

Acalypha stachyura Pax, Repert. Nov. Sp. 7: 110. 1909; 65. *A. macrophylla* Ule, Verh. Bot. Ver. Brandenb. 50: 79. 1908, not HBK. or Poeppig.

Glabrous (or the leaves early puberulent) except the puberulent sulcate branchlet tips and the inflorescences; petioles in age 4–16 cm. long; leaves oblong, obtuse or rounded at base, caudate-acuminate, 1.5–3 dm. long, 5–11.5 (15) cm. wide, serrate dentate, membranous, pinnately nerved with 8–10 secondary nerves, the lowest basal or nearly; flowers monoecious, the slender dense axillary male spikes 6–15 cm. long, the terminal female in flower about 10, in fruit to 25 cm. long, pedunculate; sometimes the female spikes are male

toward apex for about 3 cm.; fruiting bracts finally subglabrous, to 1.5 cm. long, eglandular, 1-flowered, nearly medially 5–10 dentate, the middle of the triangular teeth the larger; sepals acute, pulverulent; ovary tomentulose; styles 5–10 mm. long, pinnately 10–15 lacinulate; seeds 2.5 mm. long, smooth.

The species (a slender tree, the bark abundantly lenticellate, Williams, Field. Mus. Bot. 15: 266. 1936) seems fairly well marked by the minute distinct leaf-dentation, but this is more crenate and more approximate in the type of *A. stachyura* so the Peruvian plant may not be the same as indicated by the monographers; however, if another name is required for the plant of Peru there will probably prove to be an available synonym, for instance *A. stenoloba* (which compare) or *A. Lechleri* Britton, 65, the type without data said to be distinguishable by its dioecious flowers, styles only 2 mm. long, the first character probably unimportant and the second perhaps an error, typographical or in observation. Apparently better defined is *A. grandispicata* Britton, 65, also Bolivian with female spikes to 2.5 cm. wide, and 14–16 secondary nerves. *A. stellipila* Pax & Hoffm., 49, Ecuadorean, has the pubescence of *A. dictyoneura* with apparently axillary spikes. F.M. Neg. 5299.

San Martín: Tarapoto, *Ule 6656* (type, *A. macrophylla*). San Roque, *Williams 7037* (det. *A. benensis*).—Huánuco: Near Tingo María, 2,400 meters, *Seibert 2254* (det. A. C. Smith).—Junín: San Nicolás, *Killip & Smith 26109; 26026* (det. *A. benensis*). Dos de Mayo, *Killip & Smith 25836*. Eneñas, *Killip & Smith 25787* (det. Croizat, *A. Lechleri*). Chanchamayo Valley, *Schunke 449; 451; 558; 562* (all det. *A. benensis*). Hacienda Schunke, *5651; Killip & Smith 24641*.—Loreto: Florida, *Klug 2165* (det. Standley, *A. benensis;* Croizat, *A. stachyura*). Santa Rosa, *Killip & Smith 28975*. Fortaleza, *Williams 4184*. Puerto Arturo, *Williams 5185; 5251*. Bolivia. "Yana ocuera de oyada" (Williams), "ucutu fenana" (Klug, Huitoto).

Acalypha stenoloba M. Arg. in Flora 55: 41. 1872; 61. *A. capillaris* Rusby, Mem. Torrey Club 4: 257. 1895. *A. Baenitzii* Pax, Repert. Nov. Sp. 5: 227. 1908. *A. ovata* Pax & Hoffm. Meded. Rijks Herb. Leiden 40: 23. 1921, fide Pax and Hoffmann as other synonyms.

Shrub or small tree 4–5 meters high, the ligneous branchlets as the remains of younger parts minutely pulverulent; petioles 1–7 cm. long; leaves oblong- or lanceolate-ovate, cuneate to obtuse base, cuspidate-acuminate, 9–15 cm. long, 2–7 cm. wide, sharply serrate,

nearly glabrous but barbate beneath in the axils of the 5–6 nerves, rigid-membranous, pinnately nerved; flowers monoecious (always?), the axillary male spikes sessile, 1–6 cm. long, the terminal female 6–12 cm. long, dense, shortly peduncled with flowering bracts 5–6 mm. long, deeply 5–9-parted, lobes linear-subsetaceous, gradually long-acuminate, not papillose-asperous, fruiting to 8 mm. long, rigid, 1-flowered, the female sepals ovate or lanceolate, acute or acuminate, ciliate; ovary puberulent-pilose, finally verrucose; styles 4–8 mm. long, pinnately 7–15-lacinulate; capsules 3–4 mm. thick, the subglobose seeds smooth, nearly 2 mm. thick.—*A. lucida* Rusby, 61, probably the same, was thought to have dioecious flowers; *A. urostachya* Baill. 60, country unknown but related here, is rather tomentose and the 1-flowered auriculate female bracts are unequally parted. This may well be an earlier name for *A. stachyura*. F.M. Neg. 19517.

Cuzco: Idma, Prov. Convención, 1,500 meters, *Vargas 8559*. Without locality, *Haenke*, type. Bolivia.

Acalypha stricta Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 21. *pl. 225*. 1845; 64.

Branchlets, petioles, these 1–4 cm. long, and leaves beneath densely tomentose, the latter sparsely so above, ovate or oblong-ovate, rounded-cordate at base, acuminate, a dm. or two long, about half as wide, membranous or chartaceous, 3–5-nerved at base, above pinnately; flowers monoecious, the axillary male spikes 5–10 cm. long, 3–5 mm. thick, sessile or nearly, dense, erect, the terminal female 7–20 cm. long with flowering bracts 2–3, fruiting 7–8 mm. wide, tomentose, 1-flowered, medially 13–15-dentate with linear setose subequal teeth, the ovate acute ciliate sepals sparsely glandular; ovary villous; styles 2–3 mm. long, pectinately 10–16-lacinulate; seeds ovoid, minutely puncticulate, 1.5 mm. long.—My specimen from type locality from a compact shrub 1–2 meters high. F.M. Neg. 7128 (Pavón).

Huánuco: Hacienda Exito, bank of Río Ysabel, *Mexia 8116* (det. Standley, *A. macrostachya*). Pampayacu, *5051* (det. Johnston, *A. mapirensis*); *Poeppig*, type. Puente Durand, *Stork & Horton 9440* (det. Standley, *A. benensis*).—Junín: Huacapistana, 1,600 meters, *Weberbauer 2329*. Chanchamayo Valley, *Schunke 323; 411; 1732; 1799; Isern 2391*. La Merced, *5538* (det. Johnston, *A. mapirensis*); *Soukup 1524* (det. Ewan, *A. macrophylla*); *Killip & Smith 23744; 23743*. Colonia Perené, *Killip & Smith 25018; 25080*. San Ramón,

Killip & Smith 24749. Along Río Perené, *Killip & Smith 25123; 25189* (both det. Standley, *A. mapirensis*).—Río Acre: Seringal San Francisco, *Ule 9533.*

Acalypha subandina Ule, Verh. Bot. Ver. Brandenb. 50: 77. 1908; 20.

Similar to *A. platyphylla* but like it the male flowers unknown; petioles 2–6 cm. long, minutely or obsoletely biglandular; leaves subobovate-oblong, obtuse and lightly cordate at base, 13–22 cm. long, 6–8.5 cm. wide, glabrous or nearly from the first except scaberulous beneath; panicles 13–20 cm. long, diffuse, puberulent, the lanceolate bracts scarcely 1 mm. long, the pedicels attaining 1–2 cm., the sepals pilose; ovary muricate; styles 2.5–4 mm. long, rather stout below, 10–15-lacinulate.—Not at all well defined from the similar *A. platyphylla* M. Arg. (Pax & Hoffm.), with which it apparently should be merged, but I have seen little material. F.M. Neg. 5322.

Loreto: Cerro de Escaler, 1,200 meters, *Ule 6840,* type. Colombia.

Acalypha subbullata Pax & Hoffm. Pflanzenreich IV. 147. xvi: 67. 1924.

Shrub, the stipules caducous, the flowers monoecious, the pubescence dense and soft on the petioles (to 5 cm. long), the branchlets and the leaves beneath, these glabrescent and bullate above, chartaceous, orbicular-ovate, acute, about 9 cm. long, 6–7.5 cm. wide, 5–7 nerved from cordate base; male spikes axillary, subsessile, about a dm. long, nearly 4 mm. broad, dense, the dense terminal female with 1.5 cm. long peduncle, to 7 cm. long, the 1-flowered pubescent ovate obtusely acuminate bracts in flower 3 mm. long, entire but minutely glandular-denticulate, below strongly nerved, ovary hirsute; styles about 1.5 mm. long, shortly around 10-lacinulate.—Could prove when better known to be *A. bullata.* F.M. Neg. 32507.

Junín: Pariahuanca, *Mathews 1199,* type.—Ayacucho: Ccarrapa between Huanta and Río Apurímac, about 1,500 meters, *Killip & Smith 22379* (apparently, but specimen seen without flowers).

Acalypha subcastrata Aresch. Sv. Eugenies Resa Bot. 3: 137. 1910; 42.

Annual branching slightly pilose herb often several dm. high; petioles about as long as the ovate acuminate serrate leaves, these

usually 8 or 10 cm. long, 5–9 cm. wide, 5-nerved at base; spikes terminal and axillary, if binate, one male, the other female, the former subsessile, often very short or not exceeding 6 mm., the latter equaling or exceeding the leaves and with laciniate bracts longer than the scabrous or nearly smooth capsules, the laciniae subulate, ciliate; ovary nearly glabrous; seeds subrugose or, according to Svenson, Amer. Journ. Bot. 33: 458. 1946, practically smooth and only 1.5 mm. long. Perhaps too near *A. setosa* Rich., more northern, ovary hirsute. Differs from the Mexican and Central American *A. polystachya* Jacq. in pilosity, shorter male spikes and smoother seeds (Svenson) and it seems probable that the Pavón specimen referred to that species by Mueller actually was mislabeled, as is sometimes known to have been the case, and really came from Mexico.

Piura: Amotape Hills, (*Haught & Svenson 11511*).—Tumbez: Choza, *Weberbauer 7699* (det. Svenson). Ecuador.

Acalypha tenuipes Pax & Hoffm. Pflanzenreich IV. 147. xvi: 122. 1924.

Slender-branched shrub a meter or 2 high, early rather densely puberulent pilose with short straight and crisped trichomes, few if any glandular, later glabrate especially the thin-membranous leaves, these on slender petioles 1.5–3.5 (4.5) cm. long, the ovate or ovate-lanceolate palmately nerved blades rather coarsely crenate, acuminate, lightly cordate at base, 4–6 (8) cm. long, 2.5–3 (4) cm. wide; flowers monoecious, the usually androgynous axillary spikes slender and mostly with 2–4 female bracts at base, laxly disposed, the peduncled male portion 4–12 mm. long or several cm. in the Peruvian specimen; female bracts about 7 mm. wide, orbicular-reniform, lightly repand-denticulate or merely repand; ovary densely muricate, puberulent; styles about 5 mm. long, finally around 10-lacinulate.—Apparently very near to *A. Weddelliana* Baill. of southern Brazil, that less pubescent, but I have not seen the type at this time. F.M. Neg. 5325.

Tumbez: In deciduous bushwood on brooks, east of Hacienda Chicama, *Weberbauer 7662*. Ecuador.

Acalypha villosa Jacq. Sel. Stirp. Amer. Hist. 254. *pl. 183*. 1763; 16.

Tall, more or less copiously villous or tomentose shrub; stipules subulate; petioles usually several to many cm. long, minutely 2–4-

stipellate; leaves ovate, truncate or rounded to the somewhat cordate base, acuminate, sometimes only around 5 cm. long, 3 cm. wide, often 8–18 cm. long, 5–12 cm. wide, crenate, membranous, glandular; inflorescence branches often more or less unisexual; spikes axillary, male sometimes with female intermixed, sometimes with these at base, 3–13 cm. long, the female spikes 3–11 cm. long, much more laxly flowered, often simple; rachis pubescent, filiform, bracts minute, the male flowers glomerulate, the 2–several female minutely pedicelled, sepals 5, lanceolate, ciliate; ovary muricate, not pubescent; styles 2–3 mm. long, lacinulate to base; capsules about 2.5 mm. thick, the subglobose smooth seeds scarcely 1 mm. long.—Said typically (var. *genuina* M. Arg.) to have villosulous branchlets and petioles, soon puberulent-tomentulose, leaves barely or not cordate at the shortly contracted base, glabrate in age. Named Peruvian variants include *tomentosa* M. Arg., leaves rounded at base, pubescence soft, more lasting; *intermedia* M. Arg., leaves cordulate, pubescence tomentulose; *latiuscula* Pax & Hoffm., leaves subtruncate-cordulate, glabrate except nerves. F.M. Neg. 32504 (var. *tomentosa*).

San Martín: Tarapoto, *Ule 6638; Williams 5487; 6024; 6270.* Chazuta, *Klug 4114* (det. Standley). Without locality, *Ruiz & Pavón,* type, var. *tomentosa* (det. Boissier).—Ayacucho: Estrella between Huanta and Río Apurímac, *Killip & Smith 22661; 22662?* Central America to Bolivia and Paraguay.

Acalypha Wilkesiana M. Arg. in DC. Prodr. 15, pt. 2: 817. 1866.

Nearly glabrous bush or small tree except for some puberulence on the branchlet tips and younger leaves, these becoming broadly ovate or rotund and characteristically variegated or mottled with red or purple in some degree, somewhat acuminate, rounded or shortly cuneate at base, serrate, sometimes a dm. or two long and more than half as wide; flowers monoecious in axillary spikes, only the laxly flowered female much shorter than the leaves, these with ovate 1-flowered bracts, the middle of the 9–13 dentations much the longest; sepals 3–4, acuminate; ovary puberulent; styles 11–15-lacinulate.—Variable and long grown for its ornamental foliage in greenhouses and in tropical regions where it may become established; its origin is thought to have been in the South Pacific. Illustrated, Seemann, Fl. Vit. *pl. 58.*

Loreto: Bush in forest at Cajacuma on the Amazon River, *Williams 2010* (det. Standley). Widely cultivated in tropical regions.

23. ALCHORNEA Swartz

Reference: Pax & Hoffm., Pflanzenreich IV. 147. vii: 220–252. 1914.

Shrubs or trees often laxly branched, the indument stellate or simple, the leaves more or less dentate, bistipuled, petioled, basally and often on the face beneath maculate-glandular, the spikes normally unisexual, simple or paniculately branched, the male often axillary, the female often terminal, the former several to each bract, the latter only 0–3. Flowers monoecious or dioecious, apetalous. Male calyces valvately 2–5-parted; stamens 8 (or fewer), the filaments connate at small disk, the anthers oblong; rudimentary ovary none. Female sepals 4 (3–6); ovary 2–3(4)-celled; styles free or basally connate, usually entire. Capsules composed of 2–3 cocci or subglobose, smooth or tuberculate, the seeds nearly or quite ecarunculate.—Named for Alchorne, English botanist.

Leaves with 2 basal nerves besides midnerve.

Leaves with 1 or more secondary nerves besides the basal 2.

Leaves multiglandular at base, membranous.....*A. glandulosa.*

Leaves 2(–4), glandular at base, coriaceous.

Secondary nerves besides basal 3–5 pairs; petioles stout, many times shorter than blades.

Leaves 4–8 (10) cm. long, coriaceous.

Styles 2–3 mm. long; leaves oblongish, narrowed below the middle.....*A. brevistyla.*

Styles 7–15 mm. long; leaves ovate, rounded at base. *A. acutifolia.*

Leaves mostly 10 cm. long or longer, rigid, acuminate. *A. Pearcei.*

Secondary nerves besides basal 1–2(–4) pairs; petioles slender, mostly about a third as long as blades....*A. triplinervia.*

Leaves lacking secondary nerves besides the basal 2.*A. acroneura.*

Leaves pinnate-nerved from base, oblong.....*A. castaneifolia.*

Alchornea acroneura Pax & Hoffm. Pflanzenreich IV. 147. vii: 229. 1914.

Branchlets strict, slender, early with a few simple trichomes; petioles 2–4 mm. long, canaliculate, sparsely pilose; leaves spathulate-obovate or -lanceolate, shortly and rather abruptly narrowed to base, obtuse and slightly emarginate at tip, 3–4.5 cm. long, 16–22

mm. wide, minutely biglandular above the base, denticulate, coriaceous, glabrate above, lightly stellulate beneath, 3-nerved from base but with no other secondary nerves, the horizontal veins little prominent; flowers monoecious but the male and female spikes on diverse branchlets, the former simple, erect, slender, 2–8 cm. long, bracts acute, about 3-flowered, the latter (one seen) 2 cm. long with 6–7 sterile bracts below, the upper 1-flowered; bracts 1 mm. long, acute, strongly thickened at base; male calyx glabrous, subsessile; stamens 8, anthers apiculate; female calyx pedicel 1 mm. long, sepals 4, lanceolate, acute, puberulent; ovary stellulate; styles 2, nearly free, broad, margins narrowly revolute, smooth. Williams, Field Mus. Bot. 15: 268. 1936, reduced this to *A. triplinervia*.—Illustrated, l.c. p. 224. F.M. Neg. 24413.

San Martín: Moyobamba, 1,500 meters, *Weberbauer 4752*, type.

Alchornea acutifolia M. Arg. Linnaea 34: 171. 1865; 226.

Subscandent shrub with terete fulvous tomentose tardily glabrate branchlets; petioles 5–15 mm. long, deflexed; leaves ovate or ovate-lanceolate, base lightly cordate, especially toward cuspidate-acuminate apex sparsely serrate-denticulate, 4–10 cm. long, 2–4 cm. wide, 3-nerved, with also 3–5 secondary prominent as veins, coriaceous, glabrous and papillose above, early stellate-pilose beneath on the nerves and at base maculately 2–4-glandular; male spikes equaling or exceeding leaves, the female simple, 5–15 cm. long, rachis striate, puberulent, bracts small, those of the male several-flowered, of the female 1-flowered, 1–2-glandular both sides; flowers sessile; male calyx glabrous except at tip; stamens 8, anthers apiculate; female sepals 4, 0.5 mm. long, acute, tomentose; ovary 2-celled, spreading hispid-pilose, the purple styles very shortly connate, papillose within, 7–15 mm. long; capsules 9 mm. thick, 5.5 mm. long, pubescent, the obtusely tuberculate subglobose seeds 5.5 mm. in diameter. —Said to attain 5–9 meters. F.M. Neg. 5262.

San Martín: Tarapoto, *Spruce 4269*, type; *Ule 6409*. San Roque, *Williams 7532* (det. Mansfeld). Zepelacio, *Klug 3272* (det. Standley, *A. triplinervia* var.). In savannah woods, Moyobamba, *Weberbauer 4481; 4482;* 289.

Alchornea brevistyla Pax & Hoffm. Pflanzenreich IV. 147. vii: 227. 1914.

Similar in general character to the allied *A. acutifolia;* petioles not deflexed, 1–2 cm. long; leaves oblong, 7–9.5 cm. long, 27–38 mm.

wide, the secondary nerves less prominent; female spikes 3–5 cm. long, simple, solitary or fasciculate in the leaf-axils, the solitary pedicels 1 mm. long and bibracteolate, sepals 0.75 mm. long, subglabrous; ovary glabrous; styles 2, free, smooth, 2–3 mm. long; male flowers unknown.—As remarked by the authors, the known characters seem to be very diverse from those of the species which it so greatly resembles otherwise. Williams, however, Field Mus. Bot. 15: 268. 1936, reduced it to *A. triplinervia*. F.M. Neg. 5265.

Loreto: Iquitos, *Ule 6250*, type; *Killip & Smith 27301* (det. Mansfeld). Yurimaguas to Balsapuerto, *Killip & Smith 28157*. Mishuyacu, *Killip & Smith 29937?*

Alchornea castaneifolia (Willd.) Juss. Euphorb. Tent. 42. 1824; 235. *Hermesia castaneifolia* Willd. Sp. Pl. 4: 809. 1805.

Small nearly glabrous tree well-marked by the oblong-lanceolate leaves often 8–16 cm. long, 1.5–4 cm. wide, acutish or rounded each end, repand-serrulate or -spinulose, obscurely or obsoletely glandular at base, minutely stellulate or glabrate beneath, finely and reticulately pinnate-nerved; petioles 5–10 mm. long; male spikes simple, many-flowered, 1–2 dm. long; male perianth globose, filaments eglandular; fruiting racemes about as long as leaves, bracts ovate, acute, pedicels about 5 mm. long, the capsules as long or longer, minutely stellulate or glabrate, depressed-globose, the shorter styles spreading; seeds 7–8 mm. long.—Belongs to section *Hermesia* (Willd.) Croizat, marked by the pinnate-nerved obscurely glandular leaves and small female flowers. In Brazil at water's edge with *Salix* (Mexia) or on river bank (Williams). Illustrated, Pax, l.c. p. 236.

Loreto: Lower Río Nanay, *Williams 496*. Yarina Cocha, *Tessmann 3488*. Colombia to Paraguay. "Yacochihua" (Williams), "ipurosa" (Tessmann).

Alchornea glandulosa Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 18. *pl. 221*. 1845; 234.

Branches, petioles (1–7 cm. long) and spikes tomentulose, the former tardily glabrescent; leaves oblong-elliptic, -ovate or rarely broader, acute or rounded or narrowly subcordate at base, abruptly caudate-acuminate or acute at apex, 9–16 cm. long, 5–9 cm. wide, glandular-dentate, membranous, early finely stellulate both sides, the trichomes a little longer on the nerves, glabrate above, basally 3-nerved and also with 3–6 secondary ones; basal glands 4–7; all spikes axillary, the male panicled or simple, 2–11 cm. long, triangular

bracts about 7-flowered, the flowers 2.5 mm. broad, sepals 2–3, ovate, acute, glabrous; stamens 8, anthers not or minutely apiculate; female spikes simple, 3–6.5 cm. long, bracts ovate, subsaccate, 1–2-flowered, the 4 sepals triangular-lanceolate, acute, as long as densely fulvous ovary; styles filiform, free, papillose, 5–13 mm. long. —Var. *Pavoniana* M. Arg. has the leaves subcordate at the narrowed base, glands obscure. *A. leptogyna* Diels, Bibl. Bot. 116: 103. 1937, Ecuador, is less pubescent, leaves to 2 dm. long, 7–10 cm. wide, acumen to 2 cm. long, female spikes lax, the ovary less pilose. Determinations by Mansfeld. According to Williams attains 15 meters. F.M. Negs. 7151; 7150 (var.).

Loreto: Yurimaguas, *Poeppig 2198*, type; *Williams 3899; 4621; Killip & Smith 28209*. Without locality, *Pavón* (type, the var.). To Ecuador, Colombia and Venezuela; Costa Rica?

Alchornea Pearcei Britton, Bull. Torrey Club 28: 305. 1901; 225.

Branches often stout, the younger more or less stellate-pilose; petioles 1–2 cm. long, transversely rugose above, glabrous or pubescent; leaves oblong or elliptic, acuminate, acute or narrowed or broadly obtuse, even subcordate at base, 9–16 cm. long, 4–7.5 cm. wide, maculately biglandular, 3-plinerved, crenate-dentate, rigid-coriaceous, somewhat stellulate beneath and often barbate in the axils of the prominent nerves; male inflorescences often about 2 dm. long, the simple pendulous female a third longer; male bracts about 3-flowered, female 1-flowered, the flowers subsessile, the male 2.5 mm. broad, reddish-brown with 2 ovate glabrous sepals, 8 stamens, scarcely apiculate not emarginate anthers, the female with 4 broadly triangular sepals, 2-celled ovary, entire subfree styles 1–2 cm. long; capsules finely stellate, 11–12 mm. broad, 7–8 mm. long, the echinate-tuberculate or nearly smooth seeds 6–7 mm. in diameter.—There are two forms: var. *sclerophylla* Pax (the typical) glabrescent, the inflorescence puberulent and var. *coriacea* (Ule) Pax (*A. coriacea* Ule, Verh. Bot. Ver. Brandenb. 50: 76. 1908), branchlets as petioles and inflorescence villous. F.M. Neg. 24414.

San Martín: San Roque, *Williams 7506* (var. *coriacea*, det. Mansfeld).—Junín: La Merced, *5755* (det. Johnston).—Loreto: Cerro de Escaler, 1,300 meters, *Ule 6836* (type, part, *A. coriacea*).—Puno: Chunchusmayo, Sandía, 300 meters, *Weberbauer 1226* (var. type, *A. coriacea* and *sclerophylla*). Bolivia.

Alchornea triplinervia (Spreng.) M. Arg. in DC. Prodr. 15, pt. 2: 909. 1866; 227. *Antidesma triplinervia* Spreng. Neue Entd. 2: 116. 1821.

Younger parts somewhat stellate-puberulent-tomentose but often soon glabrate except the leaves beneath and the inflorescence; petioles usually several cm. long; leaves usually ovate or elliptic, ordinarily obtuse to subcordate at base and acute or acuminate at apex, sometimes obtuse, 2.5–15 cm. long, 2–11 cm. wide, more or less dentate, often coriaceous, reticulate-veined, elongately 3-nerved with 1–2, rarely 3–4 additional secondary nerves, maculately 2–4-glandular between the basal ones and sparsely stellulate, above soon glabrate; spikes of both sexes axillary, simple or paniculate, the solitary or fasciculate male 5–20 cm. long, the laxly flowered female 3–12 cm. or often reduced; female bracts 1–2-flowered as the male thickened at base, male pedicel short, female 1–2 mm. long; male flowers with 2 orbicular glabrous sepals, those of female 4, ovate, acute, puberulent; ovary pilose, styles 2, free or nearly, 7–15 mm. long, subsmooth; capsules 7–10 mm. broad, 5–7 mm. long, finely pilose, the pedicels 2–3 mm. long; seeds 4 mm. thick, echinate-tuberculate.—The monographers follow Mueller in recognizing many variants which mostly are not clearly defined and fail to indicate the typical characters; to var. *crassifolia* M. Arg. they refer a Ruiz specimen without locality, defining it as glabrate, petioles 2.5–6 cm. long, leaves to 9 cm. long, subcoriaceous. Williams, Field Mus. Bot. 15: 269. 1936, found the wood of the variety with slightly offensive odor and astringent taste, these qualities lacking in the material determined as typical. F.M. Negs. 21503 (var.); 21504 (var.); 32553.

Loreto: Iquitos, *Killip & Smith 27299; Williams 1527; 7988; 7972; 7980* (last two, var.). Upper Itaya, *Williams 3540*. San Ramón, *Williams 4589*. Caballo-Cocha, *Williams 2162; 2186* (both, var.). Fortaleza, *Klug 2824*. Without locality, *Ruiz & Pavón*. Southern Brazil to Paraguay and Colombia. "Mojarra," "cocopano" (both, Williams).

24. APARISTHMIUM Endl.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. vii: 257–259. 1914.

Character in general that of *Alchornea* but stamens usually 4 (3–5), the filaments long-connate and, especially, styles basally

connate, bilobed, the sessile stigma nearly as broad as long and coarsely papillose within.—The ample leaves are deflexedly bistipellate at the tip of the petioles as well as bistipulate at their base. The genus could be included in *Alchornea* as by M. Arg. Linnaea 34: 168. 1865.

Aparisthmium cordatum (Juss.) Baill. Adansonia 5: 307. 1865; 258. *Conceveibum cordatum* Juss. Euphorb. Tent. 43. *pl. 13, fig. 42a.* 1824. *Alchornea cordata* (Juss.) M. Arg. in DC. Prodr. 15, pt. 2: 901. 1866.

Slender tree sometimes about 15 meters high, the branchlets and petioles, these 3–18 cm. long, somewhat puberulent; stipules caducous, subulate, 3 mm. long, the apical stipels 1.5–4 mm. long; leaves usually broadly ovate, often rounded-cordate at base, abruptly short- or long-acuminate, commonly 1–3 dm. long, a half to two thirds as broad, denticulate to subentire, membranous or chartaceous, more or less short-pilose or glabrate both sides and with 2 basal glands beneath, the 7–11 secondary nerves prominent; male panicles and terminal female racemes about as long as the leaves, bracts of both biglandular, pedicels of latter 2–15 mm. long, flowers of former 2 mm. long, pilose without; stamens exserted, of latter, 1–2 mm. long, ciliate and puberulent; capsules 8–11 mm. thick, 6–8 mm. long, deeply 3-lobed, sparsely puberulent, the ellipsoid brown striolate seeds 5–6 mm. long, 3.5–4 mm. broad.—Williams, Field Mus. Bot. 15: 270. 1936, noted flowers as precocious(?), young bark yellowish, older brown, smooth, wood soft but used for huts (Mexia). Determinations mostly by Mansfeld. Illustrated, Pax, l.c. p. 259.

Junín: Puerto Yessup, *Killip & Smith 26285.*—Loreto: La Victoria, *Williams 2582.* Lower and upper Nanay, *Williams 356; 645; 649.* Near Iquitos, *Klug 252; 1042; Killip & Smith 27298; 27313; 29904.* Sierra del Pongo, 800 meters, *Mexia 6273; 6274* (det. Standley). Bolivia to Colombia, Guiana and Brazil (Minas Geraes). "Rucurana" (Williams), "shamboquiro" (Mexia), "ukskakiro" (Tessmann).

25. CONCEVEIBASTRUM (M. Arg.) Pax & Hoffm.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. vii: 217. 1914.

In general like *Conceveiba* but male flowers unknown. Indument stellate and simple. Stipules conspicuous, almost foliose. Female flowers in stout terminal racemes with 10–12 broad imbricate sepals

notably biglandular without. Styles biparted to base, the circinate-involute lobes coarsely papillose within. Seeds ecarunculate, truncate.—Probably this plant, apparently marked only by the sepals, and several related ones should be brought into one group but until completely known another disposition seems inadvisable, since only by chance would it prove to be definitive.

Conceveibastrum Martianum (Baill.) Pax & Hoffm. Pflanzenreich IV. 147. vii: 217. 1914. *Conceveiba Martiana* Baill. Adansonia 5: 221. 1865. *Alchornea Martiana* (Baill.) M. Arg. in Mart. Fl. Bras. 11, pt. 2: 375. 1874.

Tree with stout angulate densely leafy reddish puberulent branchlets and lanceolate acute stipules retrorsely saccate-produced at base, 3–4 cm. long, 6–7 mm. wide; petioles glabrate, 9–12 cm. long; stipules auriculate-verruciform; leaves ovate, narrowly and deeply cordate at base, obtuse, 1–3 dm. long, 1–2.5 dm. wide, crenate-dentate, chartaceous, finally glabrate above, beneath especially on the 7 basal nerves simply and stellately rusty pubescent; fruiting racemes very stout, nearly 2 dm. long in type, bracts 2 mm. long, acute, with 2 large patellate basal glands; pedicels 6–9 mm. long, apically articulate; sepals 2–3 mm. long, 3–4 mm. wide, apiculate, glandular; ovary globose, fulvous tomentose; capsules 18 mm. broad, tomentulose; seeds 8 mm. long, 10 mm. broad, obtusely trigonous, smooth.—F.M. Neg. 5275.

Loreto: Mouth of Río Santiago, *Tessmann 4149* (det. Dahlem). Amazonian Brazil.

26. CONCEVEIBA Aublet

Reference: Pax & Hoffm. Pflanzenreich IV. 147. vii: 214–216. 1914.

Trees soon glabrescent with rather ample alternate petioled bistipuled reticulate-veined leaves and terminal puberulent panicles of apetalous flowers, the male ample, the small flowers glomerulate, the female more simple with biglandular basal bracts. Disk none. Male calyx valvately 3–4-parted; stamens about 16, free on the convex receptacle, the 6–8 outer fertile with short filaments; anthers erect, connective broad; rudimentary ovary none. Female sepals 5–8, imbricate, with alternating glands; styles little or scarcely connate, bilobed, thick-papillose. Ovary usually 3-celled. Capsules large, smooth or echinate, the seeds carunculate.

Styles longer than calyx; capsules smooth, 3-ribbed. . *C. guianensis.*
Styles short; capsules subechinate-rugulose. . . . . *C. rhytidocarpa.*

Conceveiba guianensis Aublet, Pl. Guian. 2: 924. *pl. 353.* 1775; 214.

Straight-trunked tree, nearly glabrous except for the puberulent tips of the stout branchlets; petioles 2–4.5 cm. long; leaves usually distinctly glandular at obtuse or acutish base, obtusely short- or caudate-acuminate, often remotely denticulate, 1–3 dm. long, about half as wide, oblong- or oval-elliptic, sparsely stellate at least beneath, puncticulate above, membranous or coriaceous; male flowers small, subsessile in many fascicles on the spreading branches of the ample panicles; female flowers in racemes, the basally bracteolate pedicels elongate; ovary tomentose, 3-ribbed as capsule, the basally connate styles recurved-spreading; capsules 2–2.5 cm. long, 2 cm. broad, ligneous, the smooth seeds 1 cm. long, the caruncle small.—Steyermark, Field Mus. Bot. 17: 414–415. 1938, proposed three new species from as near as São Paulo de Olivença, Brazil, which may be expected within Peru: *C. magnifica,* sepals eglandular, *C. Krukoffii,* style column longer, 3 mm. long and *C. simulata,* male inflorescence shorter, fertile stamens usually 9, sterile 9–10, instead of 6–8 for each; fruits are unknown for these and they may replace the typical form in the Upper Amazon but the observed differences may be included within the range of variation for *C. guianensis.* The seeds are said to be edible. Illustrated, Mart. Fl. Bras. *pl. 55* and Pax & Hoffm. l.c. 215.

Peru (probably or one of the related forms as noted above). Guianas.

Conceveiba rhytidocarpa M. Arg. in Mart. Fl. Bras. 11, pt. 2: 372. 1874; 216.

Resembles *C. guyanensis;* leaves obsoletely biglandular at base, firm; male flowers unknown; female inflorescence spicate; ovary 4-celled; style very short, bilobed; capsules 13–14 mm. broad, subglobose, densely subechinate-rugose.—Doubtful species apparently aberrant in its 4-celled ovary. *C. trigonocarpa* M. Arg., 216, has short erect styles on an acutely trigonous ovary. F.M. Neg. 24395.

Loreto: Yurimaguas, *Poeppig 2485,* type.

27. CARYODENDRON Karsten

Reference: Pax & Hoffm. Pflanzenreich IV. 147. vii: 263–264. 1914.

Trees, glabrous except for some simple pubescence in the inflorescences of dioecious apetalous flowers, the ample alternate entire leaves bistipulate and maculately biglandular above the obtuse or acute base. Male spikes terminal or axillary below the branchlet tips, the flowers sessile, subglobose in bud, valvately 3-lobed at anthesis, the lobes ovate; stamens 4–6, inserted about a thick broad disk, sometimes with one in the center; filaments free, the dorsifixed anthers ovoid. Female sepals ovate (disk annulate), imbricate under the ovoid-globose hard dehiscent 3(2–4)-celled fruit (this unknown in Peruvian species). Seeds solitary, ecarunculate.

Caryodendron grandifolium (M. Arg.) Pax in Pflanzenfam. 3, Abt. 5: 52. 1890; 263. *Centrodiscus grandifolius* M. Arg. in Mart. Fl. Bras. 11, pt. 2: 327. *pl. 102.* 1874.

Younger branchlets compressed toward tips, soon obtusely angled; petioles stout, 1–5 cm. long; stipules ovate, subacute, rigid, ciliolate, glabrate, about 3 mm. long; leaves elliptic-oblong, shortly and obtusely acuminate, about 1.5–2 dm. long, to 1 dm. wide, cartilaginous-margined, pale green, reticulate-veined with 9–12 pairs of secondary nerves; male spikes floriferous to base, stout, erect, 5–9 cm. long, rachis 1.5–2 mm. thick, the approximate very broad rounded ciliate bracts many-flowered; pulvini of the sessile flowers densely bracteolate, glabrous flowers 2 mm. long at anthesis; male sepals broadly ovate, acute; stamens 6–7, connective entire, truncate; disk ciliolate, thick, produced between the filaments and quasi 6-radiate; female flowers and fruit unknown.—In the similar type of the genus, *C. orinocense* Karsten, to be expected within Peru and known by the native name "Tagni" or "Palo de Nuez," with only 4 stamens, the connective bicuspidate, the glabrous capsule is nearly 4 cm. wide and subtended by the 5 or 6 obtuse sepals, the edible ovoid seed about 3 cm. long; it is illustrated by Karsten, Fl. Columb. 1: *pl. 45.* Simulates in general appearance species of *Sapium;* the white light wood serves for the preparation of a coal for Sprengpulver (Peckolt, Ber. Deutsch. Pharm. Gesellsch. 15: 242. 1905).

Río Acre: Río Macauhán, *Krukoff 5553* (det. Steyermark). Southern Brazil. "Pao podre" (Brazil).

28. ADENOPHAEDRA M. Arg.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. vii: 261–262. 1914.

Nearly smooth shrubs, the caducous indument simple, with cuneate-based shortly petioled alternate pinnate-nerved leaves and apetalous dioecious flowers borne in very slender elongate spikes, the male sometimes paniculately branched. Male perianth 3(rarely 2)-parted, stamens 3 (2), the short stout filaments connate at base, anthers ovate, cells distinct, connective glandularly enlarged and produced; disk and ovary none or latter very minute; female perianth with 6 biseriate imbricate sepals, the 3 inner smaller, disk annulate, ovary 3-celled, styles sessile in the stigmatic 3-lobed disk. Capsules depressed, seeds globose, smooth, ecarunculate.

Adenophaedra megalophylla M. Arg. in Mart. Fl. Bras. 11, pt. 2: 386. *pl. 101.* 1874; 262.

Branchlets slender, early appressed strigose; petioles 3–30 mm. long, in type soon glabrous, rugulose; leaves obovate-spathulate or elliptic-lanceolate, acute, long-cuneate to base, repand-dentate or subentire above, subcoriaceous, glabrous, spotted glandular above, reticulate-veined beneath, often 12–22 cm. long, 4.5–9 cm. wide; male spikes terminal and in the upper axils, equaling or exceeding the leaves, the branches spreading, rachis pubescent, slender; bracts distant, ovate, acuminate, many-flowered; pedicels 1–1.5 mm. long; sepals minute, ovate, acute, puberulent; glands large, nearly as long as anthers; larger outer female sepals 3 mm. long; ovary orange-red pubescent; capsules 10–11 mm. broad; 7 mm. long, deeply lobed; seeds 5 mm. long, subglobose, maculate-striate.—The Peruvian specimens are young; the petioles are densely pubescent and the leaf glands few and obscure; the related species *A. grandifolia* (Klotzsch) M. Arg. (but female flowers unknown to author) has eglandular leaves, male inflorescence simple. A tree 2.5–6 meters high (Klug).

Loreto: Mishuyacu near Iquitos, *Klug 61; 1383* (both det. Mansfeld). Southern Brazil.

29. CLEIDION Blume

Reference: Pax & Hoffm. Pflanzenreich IV. 147. vii: 288–298. 1914.

Shrubs or small trees with alternate usually dentate petioled leaves and apetalous flowers, the male sessile in axillary spikes, the female well-pedicellate in racemes or panicles, the pedicels sometimes apically clavate. Indument simple. Disk none. Male calyx valvately 3–4-parted; stamens many (35–80) congested in alternate

verticils on a convex or conical receptacle, the younger anthers affixed dorsally about medially to filaments, the 4 quasi-cruciate cells finally confluent. Rudimentary ovary none. Female sepals 3–4 (5), imbricate. Ovary 3(2)-celled, the elongate filiform styles often connate basally, deeply bifid, densely and minutely papillose within. Capsule-cocci sometimes by abortion 1, the subglobose seeds ecarunculate.—Seems to be much like *Alchornea* except for the cleft styles, a character which elsewhere in the family is not always generically significant. However, Croizat, Journ. Arnold Arb. 24: 167. 1943, remarks that "both tradition and an aggregate of characters have rightly maintained them as distinct genera."

Petioles about 5 mm. long; female inflorescence branched. *C. amazonicum.*

Petioles much longer; female inflorescence simple. . *C. castaneaefolium.*

Cleidion amazonicum Ule, Verh. Bot. Ver. Brandenb. 50: 76. 1908; 294.

Shrub or small tree 3–6 meters high, the terete slender branchlets early appressed puberulent; petioles 5 mm. long, pubescent as the subpersisting subulate 4 mm. long stipules; leaves oblong or obovate, obliquely and narrowly cordate at base, shortly cuspidate-acuminate, the apex itself obtuse or sometimes mucronulate, 10–23 cm. long, 5–8 cm. wide, denticulate, firm-membranous, basally maculate-glandular beneath, the 6–8 nerves slightly pilose, the veins reticulate; male spikes to 2 cm. long, densely flowered to base, the rachis spreading pilosulous, the acuminate 1 mm. long bracts 3–5-flowered, the 1 mm. long elliptic sepals acute; stamens about 50; female panicles 9–12 cm. long, ovate acuminate bracts 1.5 mm. long, 1–3-flowered, the pedicels apically enlarged, 4–14 mm. long, sepals 1.5 mm. long, lanceolate, medial nerve carinate pubescent; styles 5–8 mm. long, linear, reddish within; capsules unknown.—Bark thin and smooth (Williams).

Loreto: Paranapura, lower Huallaga, *Williams 4600; 5272* (det. Mansfeld). Florida, *Klug 2025; 2367* (det. Standley).—Río Acre: Varzea land, Río Macauhán, *Krukoff 5694.* Amazonian Brazil; Bolivia.

Cleidion castaneaefolium M. Arg. Linnaea 34: 184. 1865; 295.

Branchlet tips as the apically tumidulous petioles (these 1.5–4 cm. long) and inflorescences subvelutinous with short fulvous tri-

chomes; leaves lanceolate-elliptic, acute at base, shortly cuspidate-acuminate, 18–22 cm. long, 9–12 cm. wide, coarsely and obtusely serrate; male spikes many times shorter than the leaves, flowers glomerately spicate, bracts broadly ovate, acuminate, sepals ovate, acute, little puberulent; stamens about 70; complete female spikes not seen, sepals narrowly triangular-ovate, acuminate, ovary 3-celled, pubescent, styles firm, linear; capsule large with 6 alternately unequal lobes, the cocci carinate dorsally.—This is incompletely known. F.M. Neg. 7159.

Peru: Without locality, *Ruiz & Pavón*, type.

30. BERNARDIA [Houst.] Adans.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. vii: 21–44. 1914.

Usually shrubby and pubescent with simple or partly fasciculate trichomes, alternate pinnate- or basally trinerved leaves, more or less dentate and maculate glandular at base, stipules small. Male flowers in axillary spikes sometimes short and capituliform with numerous bracts, the female flowers ordinarily in terminal short inflorescences or in the upper leaf-axils or in many-flowered racemiform spikes with firm or coriaceous concave bracts. Male calyx valvately 3–4-parted at anthesis with 4–22 free stamens, the filaments dilated toward base, the subglobose anthers quasi-cruciately 4-celled; disk usually glandular; rudimentary ovary none. Female sepals 4–6, hypogynous disk annulate with distinct glands, ovary 3-celled, the short styles often continuous with carpels, the style lobes smooth or lacerate. Capsules 3-lobed, endocarp crustaceous, seeds ecarunculate, more or less carinate.—Genus commemorates one of a famous family, Bernard de Jussieu (1699–1776). It is probable that the following species or one of several from Brazil will be found in southern Peru.

Bernardia Jacquiniana M. Arg. Linnaea 34: 173. 1865; 31.

Shrub or little tree, the pubescence somewhat spreading or mostly on the branchlets retrorse, the subterete branches equally foliose with lanceolate-oblong membranous crenate-denticulate leaves usually 1–2 dm. long, about a third as wide, acute at biglandular base and many-glandular toward the acuminate apex; petioles 2–10 mm. long; secondary nerves 5–10, the tertiary impressed reticulate above; stipules subulate, 1.5–2 mm. long; male spikes 5–10 cm. long, often floriferous to base, densely tomentose, bracts broadly ovate,

acuminate, carinate, 7–10-flowered, pedicels 1 mm. long; sepals 3, oblong, acute, densely pubescent both sides; stamens 9–12; disk glands small; female sepals 5, pubescent without, 3–4 mm. long; disk urceolate; ovary sericeous; styles deeply bifid; capsules about 5 mm. long, tomentulose; seeds 4 mm. long, crenate-subdentate below dorsally.—F.M. Neg. 5253.

Peru (probably). Ecuador to Venezuela.

31. JATROPHA L.

Reference: Pax, Pflanzenreich IV. 147: 21–113. 1910, and later; see l.c. xiv. Add. 6: 38. 1919.

Ligneous, sometimes trees or fleshy rhizomatous perennial herbs with alternate usually palmately lobed or divided leaves (rarely entire or pinnately lobed) often more or less glandular and small or setaceously dissected stipules that are sometimes spinescent. Pubescence never stimulose. Petiolar glands various, but not as in *Cnidoscolus*. Flowers commonly monoecious, disposed in dichotomously branched cymes. Sepals and petals 5, the former imbricate, more or less connate at base or in male flowers forming a tube and petaloid, the latter when present contorted-imbricate, free or somewhat coherent, thus seemingly sympetalous. Disk gland if annular sessile, usually distinctly 5-glandular. Stamens biverticillate, 6–10, more or less monadelphous, the outer 5 epipetalous; staminodia usually none or filiform. Ovary 2–3(4–5)-celled, styles connate at base, entire or bifid, the stigmas capitate or hooded; rudimentary stamens rare, ovules solitary. Fruit capsular, seeds carunculate.—According to McVaugh pith is usually relatively small and solid in contrast to that of the closely related genus *Cnidoscolus*.

Leaves eciliate, the lobes entire or with a few teeth.
  Leaves shallowly lobed if at all.....*J. Curcas.*
  Leaves deeply lobed.
    Stipules glandiform, sessile; leaves epeltate.....*J. macrantha.*
    Stipules dissected.
      Leaves subbasally multi-lobed.....*J. multifida.*
      Leaves medially 5-lobed, peltate.....*J. Weberbaueri.*
Leaves ciliate, often glandular and minutely denticulate.
  Leaves shallowly lobed, medially peltate.....*J. Humboldtiana.*
  Leaves deeply and acutely lobed, often epeltate.

Leaves broadly 3–5-lobed, never nearly to base.

Leaves all or mostly 5-lobed; stipules glandiform. . .*J. ciliata.*

Leaves all or mostly 3-lobed; stipules as petiolar trichomes dissected.....*J. gossypifolia.*

Leaves narrowly 5–7-parted nearly to base; stipules dissected, petiolar trichomes simple.....*J. clavuligera.*

Jatropha ciliata M. Arg. Linnaea 34: 209. 1865; 47. *J. Hoffmanniae* Croizat, Journ. Arnold Arb. 24: 168. 1943. *J. longipedunculata* Pax & Hoffm. Pflanzenreich IV. 147: 85. 1910, and 147. xvii. Add. 7: 191. 1924, not Brandg. 1920. *J. Augusti* Pax & Hoffm. l.c.

Glabrous, with stout cicatrose rather fleshy branches; petioles 6–12 cm. long; stipules reduced to 1–3 sessile glands; leaves 6–12 cm. wide, and long, openly cordate at base, or sometimes somewhat peltate, more or less 5-lobed, the lobes cuspidate-acuminate and unequally ciliate-denticulate and glandular exceeding the early shortly (often elongating) and stoutly peduncled corymbiform cymes; bracts linear-lanceolate or ovate; sepals 2.5 mm. long, oblong-rhombic to orbicular-ovate, erose-denticulate, acute (male) or acuminate; petals scarlet, about 1 cm. long; male disk with ovate squamiform glands; stamens 8 (9), shortly monadelphous; ovary glabrous or essentially, the brown seeds 1 cm. long.—At flowering nearly or quite leafless. With regret I have concluded that *J. Augusti* is merely the state with leaves shallowly peltate; my *2331* exhibits openly cordate leaves with one or two peltate ones. Plants with peduncles to 15 cm. long may be noted as var. **longipedunculata** (Pax & Hoffm.) Macbr., comb. nov.—*J. longipedunculata* Pax & Hoffm. l.c. not Brandeg., *J. Hoffmanniae* Croizat—but the typical form grows in the same region. Stork and Horton noted the long peduncles as "conspicuously red." F.M. Negs. 24382; 5379 (*J. Augusti*).

According to Ruiz and Pavón an infusion of the root was considered a powerful aphrodisiac, a reputation still persisting (West).

Huánuco: Near Huánuco, *Ruiz & Pavón*, type, also *Dombey 2331; Stork & Horton 9394;* stony hillsides, *Weberbauer* (type, *J. Augusti*); *Soukup 2226; Ledig 12.*—Huancavelica: Río Mantaro below Succubamba, 1,500 meters, *Weberbauer 6488* (type, *J. longipedunculata*); *Stork & Horton 10401.*—Apurímac: 2,500 meters, *Weberbauer 5850* (det. Mansfeld). Río Pachachaca, *West 3796; Goodspeed Exped. 10530; Herrera 3053.* "Huanarpo," "huanarpo-maachou," "higos del duende."

Jatropha clavuligera M. Arg. Linnaea 34: 209. 1865; 28.

Branchlet tips as the leaves both sides and shortly peduncled cymes rather densely short-villous, this indument on the long petioles mixed with some simple gland-tipped longer subsetose trichomes; leaves 5–7-parted nearly to the cordate base, the divisions lanceolate or narrowly elliptic, minutely denticulate, acute, 4–8 cm. long, 8–16(–30) mm. wide; stipules dissected, 5–7 mm. long; bracts lanceolate, glandular ciliate as the acuminate male sepals, these 4–5 mm. long, the glabrous obtuse purplish or blood-red petals little longer; disk glands truncate, free; filaments monadelphous nearly entire length; female sepals slightly larger, the petals acute; capsules more or less hirsute, subglobose, about 1 cm. long, the pale seeds spotted.—The single Peruvian collection has smaller leaves. F.M. Neg. 7160.

Cajamarca: Bellevista to union of Ríos Chinchipe and Marañón, 600 meters, *Weberbauer 6223* (det. Mansfeld). Bolivia.

Jatropha Curcas L. Sp. Pl. 1006. 1753; 77. *Castiglionia lobata* R. & P. Prodr. 139. *pl. 37.* 1794.

Shrub or small tree sometimes several meters high with orbicular-ovate acutely and shallowly 3–5-lobed leaves or these merely sinuate-undulate, openly cordate at base, and greenish-yellow flowers, the petals cohering nearly medially, in slender-peduncled cymes shorter than the foliage; leaves 6–15 cm. long and broad, early tomentulose, later puberulent only on the nerves beneath where paler and reticulate-venose; bracts lanceolate, 4–8 mm. long, pubescent as also the pedicels, the ovate subobtuse sepals sparsely so, nearly free, the male 3.5 mm. long, deciduous, the female acuminate and accrescent beneath the large drupe-like (to 4 cm. long) capsule; petals lightly villous within, disk glands distinct, outer stamens nearly free; ovary glabrous, stigma bifid; seeds to 2 cm. long, oblong-ellipsoid, pale with dark striae and prominently reticulate.—Illustrated, Pax, l.c. 78.

Widely distributed or cultivated; the seeds contain an odorless oil that is very active as a cathartic and used for soap and lubricating; 4–5 seeds are said to cause death but roasting destroys their harmfulness. Bark papery; latex translucent (Williams).

Piura: Serrán, Huancabamba, *Stork 11383.*—Cajamarca: (fide Herrera).—San Martín: Tarapoto, *Williams 5855.*—Lima: Surco, *Ruiz & Pavón.*—Loreto: Pinto-cocha, middle Nanay, *Williams 816.* Near Iquitos, *Klug 249.* Pebas, *Williams 1582.* Leticia, *Williams*

3062.—Cuzco: Valle de Santa Ana, *Raimondi.* Santa Rosa, *Soukup.* South America to Mexico and the West Indies. "Piñon," "piñol."

Jatropha gossypifolia L. Sp. Pl. 1006. 1753; 26.

Tall herb or fleshy-ligneous below marked by the filiform-dissected gland-tipped stipules, their divisions simulating the branched gland-tipped trichomes that sparsely ornament the long slender petioles; leaves slightly cordate at base, more than medially 3-lobed or sometimes with 2 extra shorter lobes, somewhat pubescent or glabrous, the lobes acute, entire or often glandular-denticulate; flowers few, in shortly peduncled cymes with linear gland-margined bracts; sepals 5–7 mm. long; petals obovate, the obovate purplish petals little longer; stamens usually 8; ovary pubescent, the glabrate 3-sulcate capsules 1 cm. thick, the oblong seeds brown.—As in a number of other species, the oil of the seeds was at one time used as a purgative. Illustrated, Bot. Reg. *pl. 746.*

San Martín: Clearing, Chazuta, *Klug 3974.* Tarapoto, *Williams 5423; 5544.*—Loreto: Near Iquitos, *Williams 1387.* In forest, Caballo-Cocha, *Williams 2215.* Leticia, *Williams 3033.* To Mexico and the West Indies. "Piñon negro," "piñon."

Jatropha Humboldtiana McVaugh, Bull. Torrey Club 72: 35. 1945. *J. peltata* HBK. Nov. Gen. & Sp. 2: 104. 1817, vix Sessé ex Cerv., 1794.

In general like *J. Weberbaueri;* leaves 3–5 cm. across, 5–7-lobed, glaucescent and glandular-ciliate; sepals of male flowers obtuse, minutely denticulate, 1.5 mm. long; disk glands free; anthers elongate; capsules 14 mm. long, 12 mm. thick, globose-ovoid.—The earliest described species in a group of five (or more) that are much alike except for development of glands and slight differences in flowers, especially in size of parts.

Cajamarca: Jaén de Bracamoros at Tomependa, *Humboldt & Bonpland,* type. Jaén to Bellavista, 700 meters, *Weberbauer 6211.*

Jatropha macrantha M. Arg. Linnaea 34: 209. 1865; 48.

Spreading stockily branched glabrous shrub sometimes a meter high, the more or less fleshy branches conspicuously marked by the callus-margined scars of the fallen petioles; leaves 10–12 cm. wide, 9–10 cm. long, deeply cordate at base, more than medially 3-lobed, the lobes broadly ovate, more or less imbricate, acute, entire; stipules glanduliform; cymes shortly peduncled, the few large

scarlet-red flowers capitately congested, the lower bracts foliaceous, ovate-lanceolate, acuminate, to 10 mm. long; sepals of male flowers oblong-ovate, acute, glandular-dentate, free, 4–5 mm. long; petals to 2 cm. long, oblong, obtuse, clawed, free; glands distinct; stamens 10, the outer shorter, the inner long-monadelphous; ovary glabrous.—Typical plant for the western middle slopes; the thick stems become decumbent toward the base, the showy scarlet blossoms appearing during the dry period tardily accompanied by the leaves which early are brownish and sticky as the sap of the fleshy branchlets. Illustrated: habital photograph Weberbauer, opposite p. 163; Pax & Hoffm. l.c. (flowers).

Cajamarca: Santa Valley, 2,200 meters, *Weberbauer*, 173.—Lima: Matucana, 2,300 meters, *2915*, also *Weberbauer*, 268 and others; 163, 164, 166; *Stork & Horton 9136; Soukup 2135; Rose & Rose 18643.* —Ancash: Lomas de La Chay, *Goodspeed Exped. 9217* (det. Johnston). —Huánuco: Near Huánuco, *Ruiz & Pavón*, type.—Arequipa: Huasachi, *Balls 5878* (det. Killip). Laspinas, *Goodspeed Exped. 22145* (det. Johnston). Socabaya, 2,300 meters, *West 7140* (det. Wheeler). "Huancarpo de Canta" (Ruiz & Pavón), "barbasco" (Balls).

Jatropha multifida L. Sp. Pl. 1006. 1753; 40.

Slender-stemmed tall shrub or tree-like with long-petioled palmately divided leaves, the many lanceolate acuminate sometimes lobed divisions extending nearly or quite to base, often 12–15 cm. long, 1.5–2.5 cm. wide; stipules eglandular, setaceously dissected, 1–2 cm. long; peduncles elongate, the cymes of small red flowers several cm. wide, the male petals to 5, the female to 7 mm. long; capsules subpyriform, smooth, yellow, nearly 3 cm. long.—Illustrated, Mart. Fl. Bras. 11, pt. 2: *pl. 69.*

This distinctive species widely cultivated in warmer and tropical regions was apparently found established as noted by Williams. The young leaves are said to be used as a vegetable while the seeds at one time were employed medicinally.

San Martín: Morales, Tarapoto, cultivated, *Williams 5692.* San Roque, weed, *Williams 7349.*—Loreto: Near Iquitos, *Williams 1528.* Brazil to Texas and the West Indies. "Piñon."

Jatropha Weberbaueri Pax & Hoffm. Pflanzenreich IV. 147: 45. 1910.

Entirely glabrous shrub or small tree, the branches rather fleshy, the leaves centrally peltate, the stipules finely dissected, gland-

tipped, 5 mm. long; petioles 6–8 cm. long, somewhat pruinose as the long-peduncled cymes, these corymbiform and with scarious lanceolate caducous bracts; leaves 8–9 cm. across, palmately 5-lobed, truncately emarginate at base, the sinus between the short ovate setaceous-acuminate eglandular entire (or few dentate) lobes nearly rectangular-obtuse at base; male sepals medially connate, acuminate, 4 mm. long, petals obtuse, free, 18 mm. long; filaments 8, anthers 5–6 mm. long, disk glands free; female sepals free, 7–8 mm. long, accrescent beneath the fruit; petals broader, 9–10 mm. long, disk irregular; styles slender, connate at base.—*J. nudicaulis* Benth. of Ecuador has small stipules bearing very long caducous trichomes. Illustrated, Pax & Hoffm. l.c. 44.

Piura: Valley of the Río Quiros, 1,300 meters, *Weberbauer 6355*. —Cajamarca: Cutervo, *Stork & Horton 26327* (det. McVaugh).—Huánuco: Luya, Tupen, valley of the Marañón, *Weberbauer 4779*, type. Ecuador.

32. CNIDOSCOLUS Pohl

Reference: McVaugh, Bull. Torrey Club 71: 457–474. 1944.

Like *Jatropha* but apetalous and the pubescence at least in part stimulose (often long and rigid) trichomes. Glands sometimes present at top of petiole. Stem pith characteristically white and divided into thin transverse plates. Styles 3–5 times dichotomous with slender tips. Female flowers ordinarily with rudimentary stamens and male with filiform staminodia. Annular gland usually raised above base of staminal column.—After McVaugh, from whose thoughtful and clear synopsis the following key is compiled. He has called attention to the fact that the list of species of *Jatropha* given by Pax and Hoffmann in Pflanzenfam. ed. 2. 19c: 164. 1931 that are to be referred to this genus are not there validly transferred since previous publication reference was omitted. Once I thought to accept transfer in the case of their own Peruvian species, since the implied publication source for these seemed obvious to me.

Apical petiolar glands large, depressed, solitary or geminate; stamens usually 10, all monadelphous, the filaments biverticillate.

Leaves broadly 5-lobed about one-third, the lobes rounded-apiculate or merely acute.....*C. pyrophorus*.

Leaves 3–7-lobed at least medially, the lobes shortly acuminate. *C. jaenensis, C. tubulosus*.

Apical petiolar glands usually clustered, papilliform, usually more or less unequally elongate, if lacking, anthers many or if 10, outer filaments distinct.

Petioles and leaf-blades subequal, the latter lobed or dentate.

Leaves at least medially lobed; stamens 8–10, only inner of 2 whorls of filaments coherent.....*C. urens.*

Leaves merely lobate if at all; stamens 15–19 in 3–4 whorls.

Stamens 18 or 19 in 4 verticils; petioles usually basally biculeate.....*C. diacanthus.*

Stamens 15–17 in 3 verticils..*C. basiacanthus, C. peruvianus.*

Petioles much shorter than subentire leaf-blades...*C. hypoleucus.*

Cnidoscolus basiacanthus (Pax & Hoffm.) Macbr., comb. nov. *Jatropha basiacantha* Pax & Hoffm. Pflanzenreich IV. 147: 90. 1910.

Younger branches glabrous and estimulose; petioles glabrous but stimulose (as the leaves), including a ring of trichomes 8 mm. long at their base that, becoming indurate, persists after the petiole falls; leaves 6 cm. long and broad, rotund-ovate with cordate base, obtuse, elobate but irregularly denticulate; stipules not seen; cymes unknown; male flowers (young) about 8 mm. long, scarcely to one-half connate, puberulent or glabrate, obtuse, fertile stamens 15 in 3 verticils, the column sparsely pilose at base, disk glands nearly free, glabrous; female flowers with lanceolate glabrous free sepals 12 mm. long, glabrous lobulate disk, squamate within, appressed pubescent ovary, the styles palmately cleft.—Unless by the "ring of trichomes" at petiole-base this seems scarcely separable from *C. peruvianus.* F.M. Neg. 5381.

Lima: Matucana, 1,700 meters, *Weberbauer 1694,* type.

Cnidoscolus diacanthus (Pax & Hoffm.) Macbr., comb. nov. *Jatropha diacantha* Pax & Hoffm. Pflanzenreich IV. 147. vii: 399. 1914.

A 3-meter shrub with stout subfleshy estimulose branches; petioles soon 3–5 cm. long, glabrous, stimulose with 2 indurate spines persisting at base; leaves rotund-ovate, cordate, 10–12 cm. long, 9–10 cm. wide, glabrous but sparsely stimulose above, membranous, acute or acuminate, irregularly sinuate-dentate; cymes capitate-congested, many-flowered; male sepals connate to two-thirds into a cylindrical tube, velvety pubescent, 11–12 mm. long, the obovate lobes obtuse; fertile stamens 18–19, 4-verticillate, the

column ciliolate; disk glands glabrous; female flowers unknown; ovary densely velutinous.—Allied to *C. basiacanthus* but petioles biaculeate basally and stamens 4-verticillate (authors).

Apurímac: Between mouth of Río Pachachaca and Río Pampas on the Río Apurímac, 1,000 meters, savannah, *Weberbauer 5903*, type. Pachachaca Valley, *Goodspeed Exped. 10562* (det. Standley). Río Pampas, *West 3684* (det. Johnston).—Huancavelica: Mantaro Valley, *Stork & Horton 10402* (det. Standley). "Mula-huanuchi," "huanarpo."

Cnidoscolus hypoleucus (Pax) Pax & Hoffm. Pflanzenfam. ed. 2. 19c: 164. 1931. *Jatropha hypoleuca* Pax, Pflanzenreich IV. 147: 96. 1910.

A shrub with unarmed but stoutly stimulose branches; petioles about 1 cm. long, densely stimulose, otherwise nearly glabrate; leaves broadly ovate or subobovately rounded, rounded-obtuse or subcuneate at base, acute, subentire or lightly denticulate, opaque above, densely white tomentose beneath, subcoriaceous, margins and especially midnerve of the pinnate nerves stimulose, 6–10 cm. long, 6 cm. wide; cymes depauperate, sessile, glabrous; male sepals 18 mm. long, medially connate, white, puberulent, linear; stamens to 17, glabrous, monadelphous, 3-verticillate, staminodia 2–3, filiform; disk annulate; female flowers unknown; capsules verruculose, about 1 cm. long, the lustrous brown applanate seeds 7 mm. long with appressed bilobed caruncle.—F.M. Neg. 5392.

Amazonas: Stony outcrops, Tupen, 800 meters, *Weberbauer 4797*, type.

Cnidoscolus jaenensis (Pax & Hoffm.) Macbr., comb. nov. *Jatropha jaenensis* Pax & Hoffm. Pflanzenreich IV. 147. vii: 400. 1914.

A 2-meter shrub, the shortly puberulent branchlets stimulose as the petioles (to 2 dm. long), cymes and leaves especially beneath on the nerves; apical petiolar glands large, depressed, binate; leaves more or less deeply cordate, thin-membranous, nearly glabrous above, pubescent beneath, 9–28 cm. long, 10–33 cm. wide, more than medially 3–5-parted, the ovate or oblong shortly acuminate lobes entire or repand-crenate; cymes with short peduncle 6–8 cm. long; buds pyriform, opening to 1.5 cm. long, 2 cm. broad, white, the oblong lobes 8–10 mm. long, 5–6 mm. wide; stamens 10, biverticillate, monadelphous; staminodia 3, filiform, glabrous; column pubes-

cent; disk urceolate, crenulate; female calyx patellately persisting; ovary densely stimulose; capsules about 8 mm. long.—Affine *J. tubulosa* but cymes shorter, flowers large and staminal column pubescent (authors). These differences seem scarcely of specific value.

Cajamarca: In bushes, Valle de Shumba, Jaén, 800 meters, *Weberbauer 6234*, type.

Cnidoscolus peruvianus (M. Arg.) Macbr., comb. nov. *Jatropha peruviana* M. Arg. in DC. Prodr. 15, pt. 2: 1096. 1866; 90.

Younger branchlets, petioles and leaf-nerves more or less hispid with stinging trichomes; petioles not aculeate, as long as the broadly ovate leaves, these 8–14 cm. long, 9–12 cm. wide, entire or 3-lobed, cordate at base, membranous, early softly villous, finally glabrescent; stipules triangular, glandular-denticulate; cymes small, shorter than the petioles, corymbiform, bracts subulate-acuminate; male sepals nearly glabrous, two-thirds connate, 15 mm. long, fertile stamens about 15 in 3 verticils, the long stamen column pubescent at base, the anthers 2 mm. long, longer than broad; female flowers unknown. —My specimen from an open spreading plant with 3–5 stems woody below, rubber-like above, less than 1 meter high. As noted by McVaugh—see my remark at end of generic description—the listing of this species without indicating its original publication did not constitute transfer by Pax and Hoffmann. F.M. Neg. 8495.

Lima: Acotama, *Pavón*, type. Rocky hillside, Chosica, *2865*. "Huanarpo."

Cnidoscolus pyrophorus (Pax) Macbr., comb. nov. *Jatropha pyrophora* Pax, Pflanzenreich IV. 147: 101. 1910.

Stimulose but otherwise glabrous; leaves 2 dm. wide, 16 cm. long, cordate at base, 5-lobed one-third, membranous, stimulose, especially above the short rounded obtuse lobes, lightly denticulate and ciliate; cymes densely flowered, corymbiform, shortly peduncled; male sepals to 1 cm. long, connate to middle, ovate, subobtuse, merely stimulose, white; stamens 10, monadelphous, in two verticils; staminodia filiform, 3 or 4, stamen column villous at base; disk annulate, glabrous; capsule 10 mm. long, densely stimulose; seed caruncle bilobed.—A meter shrub allied to *J. urens* but with totally different androecium (Pax). Listed by McVaugh, l.c. 472, with query, as allied to *C. tubulosus*. F.M. Neg. 5400.

Cajamarca: Open formation, cacti, etc., below Santa Cruz, 1,300–2,000 meters, *Weberbauer 4129*, type.

Cnidoscolus tubulosus (M. Arg.) Johnst. Contr. Gray Herb. 68: 86. 1923. *Jatropha tubulosa* M. Arg. Linnaea 34: 212. 1865; 108.

Sometimes a tree, pubescent as well as stimulose, including the well-peduncled and many-flowered cymes; petioles 10–15 cm. long; leaves 18 cm. long, 20–24 cm. wide, cordate at base, 3–7-parted to the middle or deeper, the ovate or obovate shortly acuminate lobes entire to minutely or spinescent dentate, puberulent above, ashy pubescent beneath; male calyx at anthesis pyriform, 5 mm. long, later 7–8 mm. long, tomentulose; fertile stamens 10 in 2 verticils, sterile 5, column glabrous, female calyx shortly 5-lobed, the persisting basal part cupulate, capsule 10 mm. long, verruculose, stimulose.—The original author designated vars. *septemloba*, *quinqueloba* and *triloba*, the last with entire but minutely denticulate lobes. To avoid futile reference work it may be noted that there is no explanation by the second authority justifying his transfer.

San Martín: Near Moyobamba, *Woytkowski 35301* (distr. as *J. jaenensis*). Bolivia to Mexico.

Cnidoscolus urens (L.) Arthur, Torreya 21: 11. 1921. *Jatropha urens* L. Sp. Pl. 1007. 1753; 97.

Herbaceous or suffrutescent, to 1.5 meters, the petioles, leaves and cymes more or less pilose and stimulose; stipules small, laciniate-dentate; leaves often broader than long, usually about 12 cm. long, truncate to cordate at base, 3–5-lobed to the middle or deeper, the lobes ovate-lanceolate, acute, angulate-dentate, sinuate or pinnatifid; cymes corymbiform, shortly peduncled, rather few-flowered; male calyx to 1 cm. long, slender, constricted at throat, tomentulose and stimulose, lobed to middle; stamens 8–10, outer nearly free, villous at base; staminodia none or 2–3; ovary acute, stimulose-puberulent; styles slender, 2–3-cleft above, the divisions sometimes divided; capsules 10–12 mm. long, seeds 8 mm. long.—Variable in shape of foliage. Most of the following material has been determined in herbaria as *C. tubulosus* but it does not have the entire depressed apical petiolar glands of that species; perhaps the character is unimportant.

San Martín: Juanjuí, *Klug 3898*. Tarapoto, *Williams 5906*.—Junín: La Merced, brushy river flat, *5330*.—Cuzco: Hacienda Pabellon, Vallé de Lares, *Herrera 779; Diehl 2487; Weberbauer 7936*. Pumachaca, Valle de Santa Ana, 1,400 meters, *Herrera 3322* (Diehl). Echarate, *Goodspeed Exped. 10476*. Valle del Río Villcanota, *Mexia*

8051A. Warm America to Mexico and the West Indies. "Angeltauna" (Herrera), "vara del Angel" (Mexia).

33. CUNURIA Baillon

Reference: Pax, Pflanzenreich, IV. 147: 16–17. 1910.

Glabrous trees with alternate entire coriaceous pinnate-nerved leaves, biglandular above at base, and dioecious apetalous flowers, sessile and ternate in small congested cymules lateral or apical. Male flowers with 5 strongly imbricate sepals, no disk, 10 stamens, the short free filaments affixed to obviously elevated receptacle, anthers dorsifixed, ovary rudiment villous; female disk cupulate, glandular-lobate or none, ovary 3-celled, style short, bifid, reflexed, ovules solitary. Capsules large, subglobose, exocarp fleshy, endocarp ligneous, dehiscing into bivalved cocci with large ovoid seeds.—Baillon published his name, based on a native one noted by Spruce in Brazil, a few months before Mueller proposed another in reference to the great resemblance of the foliage to that of *Clusia*.

Cunuria Spruceana Baill. Adansonia 4: 288. August 1864; 16.

Stoutish branchlets apically clothed with stipules 5–6 mm. long; petioles 1–3.5 cm. long, less than 2 mm. thick; leaves broadly elliptic, or somewhat oblong-obovate, obtuse or subobtuse both ends, 6–14 cm. long, 4–8 cm. wide, rigid, slightly lustrous, the many parallel nerves prominent, especially beneath; cymes to about half as long as leaves; bracts minute; male calyx to 2 mm. long, subglobose, scarcely 5-parted more than medially, the broadly ovate lobes obtuse; rudimentary ovary 3-parted; capsules 4 cm. long, seeds 22 mm. long, 17 mm. broad, brown, lustrous.—Buttressed trees to 35 meters tall, the trunk to 8 dm. in diameter, fide Schultes, Bot. Mus. Leaflets Harvard 13: 269. 1949. The similar *C. crassipes* M. Arg., perhaps occurring within Peru, has petioles 2 mm. thick or stouter, much smaller capsules. Illustrated, Baldwin, Jr. & Schultes, l.c. 12. *pl. 45*.

Loreto: Mishuyacu, (*Klug 1312; 1325; 340*, det. Schultes). Colombia; Amazonian Brazil. "Cunurí" (Spruce).

34. MANIHOT Adans.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. ii: 1–99. 1910 and l.c. xiv. Add. 6: 44–49. 1919.

Usually smooth glaucescent and more or less pruinose shrubs with alternate petioled deeply lobed leaves or these rarely sessile

or undivided. Stipules sometimes foliaceous. Flowers monoecious, apetalous, racemose or paniculate, the racemes terminal or from the upper axils, the female often few or solitary near the base and long- and stoutly pedicellate, the shortly pedicelled male much more numerous, their more or less campanulate 5-parted calyx often colored, the lobes imbricate or contorted. Stamens 10, biverticillate between lobes or glands, the filaments free, the anthers dorsifixed, longitudinally dehiscent. Ovary 3-celled, the basally shortly connate styles variously lobed or dilated; ovules solitary. Capsules separating into bivalvate cocci, the seeds carunculate.—The name is of native origin.

At least two species, notably *M. esculenta* Crantz and *M. dulcis* (J. F. Gmel.) Pax are widely cultivated in tropical regions for the tuberous roots that yield a starchy meal known as Cassava, or, particularly in Peru, as Yuca; from it is prepared the Tapioca of commerce. Cutler and Cardenas in their important account of the Andean beverage "Chicha," Bot. Mus. Leaflets, Harvard 13: 33–60. 1947, give *M. esculenta* as sometimes employed in its preparation.

Leaves deeply parted, at least some of them; anthers elongate (unknown in type of *M. Pavoniana*) except *M. esculenta*.
- Bracts 6 mm. long or longer; calyces in types puberulent even without, somewhat globose, unless *M. Weberbaueri*.
  - Leaf-divisions oblong-lanceolate, 3–5 cm. wide, glaucous beneath; calyx about 1.5 cm. long..... *M. peruviana*.
  - Leaf-divisions obovate, 5–7 cm. wide, concolor; calyx about 1 cm. long..... *M. Weberbaueri, M. Pavoniana*.
- Bracts small, caducous; calyces in types glabrous without, usually campanulate, pubescent in var. of *M. dulcis*.
  - Leaves or their divisions lanceolate-spathulate.
    - Anthers short, scarcely two times longer than wide; capsules wing-angled, sometimes slightly..... *M. esculenta*.
    - Anthers elongate; capsules merely angulate above. *M. dulcis*.
  - Leaves or their divisions broadly ovate..... *M. Weberbaueri*.

Leaves all entire, linear; anthers elongate..... *M. linearifolia*.

Manihot dulcis (J. F. Gmel.) Pax, Pflanzenreich IV. 147. ii: 71. 1910. *Jatropha dulcis* J. F. Gmel. Onomat. Bot. 5: 7. 1772–78. *M. amazonica* Ule, Verh. Bot. Ver. Brandenb. 50: 83. 1908. *M. leptophylla* Pax & Hoffm. (?) l.c. *M. palmata* var. *ferruginea* M. Arg. in DC. Prodr. 15, pt. 2: 1063. 1866.

Resembles the closely related *M. esculenta* but the roots said to be always sweet, not poisonous, the anthers many times longer than broad, ovary subterete and the capsule only lightly angled above; leaves deeply 3–13-parted; panicles many-flowered; calyx 12–14 mm. long; capsule smooth, drying rugose.—Said to comprise several forms, at least the subscandent more or less pubescent Peruvian (var. *diffusa* (Pohl) Pax) perhaps a distinct species (Pax). Flowers usually greenish-white or yellowish.

Variable or there are a number of distinct entities; cf. Croizat, Rev. Arg. Agron. 10: 221–222, 225. 1943, who allies *M. amazonica* Ule, Verh. Bot. Ver. Brandenb. 50: 83. 1908, with *M. brachyloba* M. Arg., 74, and *M. tristis* M. Arg., 59, Pax, l.c. 59, both however with shorter anthers, and who thought the former to be distinct by the pendulous flowers, calyx completely glabrous even within (at least the male) and distinguished yet another form (*M. leptophylla* Pax & Hoffm., l.c. 57) in Ecuador, similar but sepals ciliate and the leaves pilosulous beneath. Much investigation is necessary before the significance of these characters which appear in bewildering maybe ecotypic variations (see Pax and Hoffmann key) can be determined; it seems probable that in this genus the same thing is happening as has been shown to occur in the case of *Hevea*. The race or species *M. amazonica* is said to be common in the Alto Acre where scandent, the flowers purple. The var. *ferruginea* (M. Arg.) Pax, rusty pubescence existing to branchlets and petioles, seems readily placed within the soon glabrate var. *diffusa*. F.M. Neg. 5432 (*M. amazonica*).

Huánuco: Cuchero, *Poeppig 1523* (var. *diffusa*, a little puberulent, but short anthers, glabrous calyx); also *Poeppig 1410* (type, *M. palmata*, var. *ferruginea* M. Arg.).—San Martín: Juanjuí, flowers yellowish and violet, *Klug 3861* (det. Standley, *M. esculenta*). Pongo de Cainarachi, flowers cream and lilac, *Klug 2662*.—Loreto: Gamitanacocha, Río Mazán, flowers scarlet, *Schunke 291* (det. Croizat, *M. esculenta* or *M. tristis*). Aguaitia, 170 meters, *Woytkowski 34448* (var. *diffusa*).—Cuzco: Cosñipata, *Vargas 007387* (var. *diffusa*). Río Ucayali, *Skutch 5009*, det. Croizat. Without locality, *Ruiz & Pavón* (var. *diffusa*). Colombia to the Guianas and southern Brazil. "Sacharuma" (Schunke).

Manihot esculenta Crantz, Inst. Herb. 1: 167. 1766; 67. *M. utilissima* Pohl, Pl. Bras. Icon. 1: 32. *pl. 24*. 1827; 67.

Slender-stemmed glaucous-pruinose shrub usually 2–3 meters high from elongate tubers; petioles finally longer than the leaf-

blades, these glabrous or minutely puberulent on the nerves beneath and, except for the uppermost, deeply 3–7-parted with spathulate- or linear-lanceolate acutely acuminate divisions 8–17 cm. long, 1–5 cm. wide, gradually attenuate to base where confluent into a disk about 2 cm. broad; stipules 5–7 mm. long, lanceolate, setaceous-acuminate, entire or 1–2-lacinulate, puberulent; peduncles usually as long as the petioles, slender, equaling the panicle branches; bracts linear-lanceolate, entire, articulately deciduous above the base; male pedicels 4–7 mm. long, the deflexed-spreading female attaining 2 or more cm.; calyx retuse at base, campanulate, glabrous without, puberulent within above, more than medially 5-parted, about 10 mm. long; disk and filaments glabrous; anthers 1.25–2 mm. long, apically hispidulous; ovary glabrous, 6-wing-angulate; capsules 1.5 cm. long, globose-ellipsoid, rugulose-asperous, the 6 wings undulate-crenulate; seeds marble-spotted.—Said to be native to Brazil but long cultivated in nearly all tropical regions for its starchy tubers, and in Peru between 1,500 and 2,200 meters (Weberbauer). According to Pax the tubers exceptionally attain 6 dm. and weigh 4 kg. while Peckolt recorded a much larger example; ordinarily however they are about half as large. They are prepared by boiling or roasting and only then are free from a poison that is present in the raw state in greater or lesser degree. Illustrated, Pflanzenreich l.c. p. 68; Mart. Fl. Bras. 11, pt. 2: *pl. 65.*

Huánuco: Weed in forest clearing, Pampayacu, *5074.*—Junín: Thicket, sandy valley floor, La Merced, *5472; Killip & Smith 23791.* —Ayacucho: Escaped near Kimpitiriki, *Killip & Smith 22911; 22964.* Aína, vine, *Killip & Smith 22712* (det. Croizat, *M. peruviana*). —Loreto: Mishuyacu, near Iquitos, *Klug 863.* Trail to San Juán, principal root crop, *Mexia 6494.* La Victoria, *Williams 2797; 3102.* Caballo-Cocha, *Williams 2491; 2492.* Lower Río Nanay, *Williams 361.* Puerto Arturo, *Williams 5095.* Yurimaguas, *Poeppig 2178.*— Cuzco: Valle de Santa Ana, 2,000 meters, Valles de Marcapata and Lares (Herrera). Brazil. "Yuca," "r'umu" (Herrera), "yuca amarillo," "yuca blanca."

Manihot linearifolia M. Arg. Flora 55: 43. 1872; 96.

Entirely glabrous, the branches slender, the internodes 3–5 cm. long, the subsessile entire linear leaves attenuate to the acutely acuminate mucronate tip, 10–14 cm. long, 6–9 mm. wide; stipules subulate-setaceous; racemes spiciform, many-flowered, about 8 cm. long, the solitary basal female flower on pedicel 10 mm. long, the

male pedicels 1–2 mm. long; bracts lanceolate-subulate-acuminate; calyces glabrous, the male 7 mm., the female 11 mm. long; filaments short, glabrous; anthers three and a half times longer than broad; disk hypogynous, undulately crisped; ovary ellipsoid, glabrous.—F.M. Neg. 19507.

Peru(?): Without locality, *Haenke*, type.

Manihot Pavoniana M. Arg. Linnaea 34: 205. 1865; 65.

Stems lax or possibly scandent, the younger parts including the leaf-nerves beneath even in age more or less puberulent or pubescent; petioles 5–9 cm. long; leaves membranous, concolor, deeply 3-parted or entire, the obovate-rhombic acutely cuspidate or acuminate lobes 13 cm. long, 5–7 cm. wide, narrowed toward base; smaller undivided leaves rounded at base or somewhat cordate, ovate; stipules deciduous; racemes peduncled, compact, the lanceolate-subulate entire bracts 6–10 mm. long, 1–1.5 mm. wide, rusty pubescent as the pedicels; male calyx finally globose-ellipsoid, 8 mm. long, puberulent without, pubescent within; filaments as connective pubescent; ovary subangled.—The Indians attribute aphrodisiac properties to the root of this plant (Ruiz & Pavón). F.M. Neg. 5464.

Huánuco: Muña, *Ruiz & Pavón*, type. Bolivia? "Simayuca."

Manihot peruviana M. Arg. Linnaea 34: 206. 1865; 29. *M. heterandra* Ule, Verh. Bot. Ver. Brandenb. 50: 84. 1908.

Stems lax or possibly scandent, apically puberulent, obtusely angled; petioles as long as the leaf blades, these early appressed puberulent above but glabrous in age, softly pubescent and glaucous beneath, all except the ovate acuminate upper ones 3–5-parted nearly to base, the oblong- or lanceolate-ovate acutely acuminate divisions 8–12 cm. long, 3–5 cm. wide; stipules 5–6 mm. long, biparted into linear-lanceolate acuminate puberulent lobes; racemes sessile, 3 cm. long, the lanceolate entire bracts 8–12 mm. long, to 3 mm. wide; calyces finally 1.5 cm. long, ovoid and 5-angled above where puberulent without, tomentulose within, the male 5-parted only medially and with glabrous disk; filaments dimorphic densely villous especially those alternate with the sepals; connective hispid; anthers elongate; ovary glabrous, prominently costate.—The Spruce specimen is the type for both names. F.M. Neg. 5465.

San Martín: Tarapoto, *Spruce 4287*, type; *Ule 6635* (det. Ule, *M. heterandra*).—Loreto: Lower Río Huallaga (*Williams 5323*, det. Croizat). Brazil?

Manihot Weberbaueri Pax & Hoffm. Pflanzenreich IV. 147. xvii. Add. 7: 194. 1924.

Branchlets apically hirtellous, soon glabrate; petioles 3.5–10 cm. long; stipules caducous; leaves entire or 3-parted, the former about 12 cm. long, 5–8 cm. wide, ovate, cuspidate, truncate-rounded at base, the latter 8–15 cm. long, 14–16 cm. wide, the short entire elliptic lobes setaceous-acuminate, sparsely pubescent near base and on nerves; secondary nerves about 6; inflorescence few-flowered, puberulent; bracts to 1 cm. long, 1–1.5 cm. wide, linear, remotely lacinulate, acuminate; male calyx 5-parted, glabrous except for 2 pilose lines within; filaments glabrous, disk pilose; female calyx completely glabrous.—Type from a 4-meter shrub.

Huancavelica: Valle de Río Mantaro, near Pampas, grass steppes, 1,300 meters, *Weberbauer 6517*, type. "Keytayuca."

35. **PAUSANDRA** Radlk.

Reference: Lanjouw, Meded. Bot. Mus. Rijksuniv. Utrecht 38: 758–769. 1936.

Small or medium glabrate lactiferous trees with bistipulate petioled glandularly dentate often cuneate-spathulate leaves 2–4-glandular at base and glomerulate dioecious or monoecious flowers arranged in slender spikes or sometimes somewhat panicled, bibracteolate in the axils of biglandular bracts. Calyx of the male with 5 (3) unequal lobes, imbricate as those of the more or less gamopetalous corolla, this barbate inside at the throat, the extra-staminal urceolate disk sometimes deeply 5-lobed; stamens 3–7, usually 6 (1 central) with oblong anthers; rudimentary ovary none. Female flowers similar but the apparently free petals medially barbate; ovary pubescent, 3-celled, the ovules solitary; styles 2-lobed. Capsules with 3 cocci, loculicidally dehiscent, the somewhat marbled seeds oblong, caruncled.—After Lanjouw, who remarks: perhaps several of the old and new species can be united, as one can find often only small differences, but for the present I think it advisable to keep them separate.

Flowers many, usually 15–40, in each glomerule, the male spikes often as long as or longer than the leaves.
P. densiflora, *P. quadriglandulosa*.

Flowers few in each glomerule, the male spikes often much shorter than the leaves.

Leaf-serrations prominent, incurved; lateral nerves 25–30; basal glands usually 4.....*P. Trianae.*

Leaf-serrations little or not incurved; lateral nerves 15–21 or rarely more; basal glands 2.....*P. Morisiana.*

Pausandra densiflora Lanj. Meded. Bot. Mus. Rijksuniv. Utrecht 38: 766. 1936.

Branchlets stout, the younger as the lanceolate acute stipules (about 8 mm. long) and petioles, these 1–3 cm. long, appressed pubescent; leaves spathulate-oblanceolate, long-cuneate to base, shortly and acutely acuminate at apex, rigid-membranous, shortly and sparsely appressed pubescent, especially beneath on the 26–29 lateral nerves, about 3–4 dm. long, a third as wide, coarsely serrate with glandular more or less incurved teeth, the 2 basal glands about 1.5 mm. long, 1 mm. wide; male spikes 4–5.5 dm. long, the many-flowered glomerules sparsely short-pubescent (both bracts and sepals); petals barbate within at throat; stamens mostly 6; female flowers unknown.—Distinguished from all species by the very long spikes and the dense glomerules (Lanjouw); however, cotype specimen matches closely in these respects type of *P. quadriglandulosa.* Illustrated, Lanjouw, l.c. p. 765.

Río Acre: Mouth of Río Macauhán, *Krukoff 5464*, type.

Pausandra Morisiana (Casaretto) Radlk. Flora 53: 92. *pl. 2.* 1870; 761. *Thouinia Morisiana* Casaretto, Nov. Stirp. Bras. Dec. 9: 75. 1845.

Young branches, petioles, these 1–6 cm. long, rugulose and slightly thicker at apex, and leaves beneath sparsely appressed pubescent, soon glabrescent; leaves oblanceolate or -oblong, long-cuneate to base, shortly acuminate, usually 1.5–3 dm. long, about half as wide, chartaceous to coriaceous, glabrous above, nerves 15–21, basal glands 2, small, subsessile, subpatelliform; male spikes 5–10 (26) cm. long, densely appressed pubescent rachis with few-flowered glomerules at short distances; bractlets and buds pubescent but unequally 5-lobed; calyx glabrous at anthesis as the basally connate petals without except the ciliolate margins but these barbate within about one-fourth above the base; disk urceolate, slightly undulate; stamens 6, anthers ovate; female spikes 7–8 cm. long, sepals pubescent, 4 mm. long, petals free, ovary pubescent; fruits about 22 mm. high, the obscurely marmorate brownish seeds about 16 mm. long, 11 mm. broad.—Similar Amazonian species include *P. macrostachya*

Ducke, 764, the type with larger leaves with about 23 lateral nerves, spikes 2–4 dm. long, petals long-connate, and *P. macropetala* Ducke, 768, collected as near as São Paulo de Olivença, the leaves glabrous both sides, the disk deeply lobed. Illustrated, Mart. Fl. Bras. 11, pt. 2: *pl. 99*, and Pax and Hoffmann in Pflanzenreich IV. 147. iii: 43. *fig. 14*.

Loreto: Mishuyacu near Iquitos, *Killip & Smith 29968* (det. Standley, *P. quadriglandulosa*). Balsapuerto, *Killip & Smith 28607* (det. Standley, *P. quadriglandulosa*).—Río Acre: Mouth of Río Macauhán, *Krukoff 5455* (det. Steyermark). To southern Brazil.

Pausandra quadriglandulosa Pax & Hoffm. Pflanzenreich IV. 147. xiv. Add. 6: 43. 1919.

Type from a shrub or a tree 3–18 meters tall, the stout floriferous branchlets soon glabrate; petioles (uppermost) 1.5–2 cm. long; leaves spathulate, long-attenuate to base, subabruptly acuminate, to 3 dm. long, a third as wide, many-nerved, coarsely serrate with incurved teeth, nearly glabrous above, lightly villosulous and paler beneath with 4 glands above the base, the 2 inner smaller, the outer conical; male spikes nearly or quite as long as the leaves, appressed pubescent, the glomerules many-flowered; male flowers finally 5 mm. long, pale yellow; calyx puberulent, lobes broadly ovate; petals connate below, the lobes reflexed; stamens 5; female flowers and fruit unknown.—Included by Lanjouw in *P. Trianae* and perhaps rightly but that as to type at least has few-flowered glomerules, much shorter male spikes. F.M. Neg. 5406.

Río Acre: Seringal San Francisco, *Ule 9538*, type. Brazil?

Pausandra Trianae (M. Arg.) Baill. Adansonia 11: 92. 1873; 763. *Pogonophora Trianae* M. Arg. Flora 47: 434. 1864.

Young branchlets and leaves, both surfaces, densely appressed pubescent, soon glabrescent; petioles 1.5 cm. long or longer; leaves ample, often 3–6 dm. long, scarcely a third as wide, oblanceolate, narrowed to base, shortly acuminate, coriaceous to chartaceous, coarsely serrate with incurved glandular teeth, usually 4-glandular at base (Lanjouw), lateral nerves many; male spikes in type 3 times shorter than leaves with small few-flowered glomerules; calyx short-pubescent with 5 short lobes; petals connate below, tomentose within at throat; stamens 5.—According to Lanjouw disk long-cupulate, slightly undulate, stamens 5–7, but he included here

P. quadriglandulosa and material from Central America. Illustrated, Lanjouw, l.c. p. 763 (leaf margin). F.M. Neg. 24574.

Peru (possibly; cf. note above). Colombia; Nicaragua?

36. POGONOPHORA Miers

Reference: Pax & Hoffm. Pflanzenreich IV. 147. iii: 108–110. 1911.

Trees with alternate petioled typically entire leaves and short axillary panicles of small glomerulate 5-merous petaliferous flowers, the male subsessile, the female shortly pedicelled. Sepals and petals imbricate, the latter longer and typically barbate; stamens 5, affixed beneath thick disk, the short filaments free, the long linear anthers apiculate; rudimentary ovary trifid, linear. Disk shortly cupulate. Ovary 3-celled; styles nearly free, irregularly bilobed, fimbriately stigmatose; ovules solitary. Capsules separating into bivalved cocci. Seeds ovoid, lustrous; endosperm fleshy, cotyledons plane.

Pogonophora Schomburgkiana Miers ex Benth. in Hook. Journ. Bot. Misc. 6: 373. 1854; 108.

Tall shrub or becoming a large tree, the branchlet tips minutely puberulent with malpighiaceous trichomes; petioles 1–3 cm. long, early pubescent like the branchlets, especially beneath, canaliculate, slightly tumidulous at tip; leaves oblong-elliptic or elliptic-lanceolate, acute both ends or shortly acuminate, often about 1 dm. long, half as wide, sometimes 2 dm. long, three times longer than wide, coriaceous, glabrous or nearly, entire, the lateral nerves 7–8, slender, the veins reticulate, little prominent; inflorescences 2–5 cm. long, sericeous; bracts ovate, 2 mm. long; calyx lobes orbicular-ovate, obtuse, the 2 outer shorter; petals narrowly elliptic, coriaceous, conspicuously and rigidly barbate within, 2.25 mm. long, the male acute, the female obtuse; interstaminal disk urceolate, 5-crenate, thick; ovary tomentulose; capsules ellipsoid, 8 mm. long, nearly as thick, the seeds fuscous.—Collected by J. Murca Pires and G. A. Black at Tabatinga, Brazil, near the boundary and so undoubtedly also within Peru.

Peru (see note above). Amazonian Brazil to the Guianas. "Aracapuri" (Pires and Black).

37. DODECASTIGMA Ducke

Trees, glabrous except the canescent tomentulose inflorescences of 3–4- or 5-merous green flowers, the male many, fasciculate in

panicles, the female solitary and scattered in few-flowered racemes. Calyx lobes both sexes with firm glabrous margins, imbricate as the externally pilose petals. Disk extra-staminal, the 14–16 (or in one species 9) stamens with free erect filaments. Ovary 3-celled, the ovules solitary, the 3 styles bifid, often with many dentate branches. Capsules elastically dehiscent, bivalved with large endocarp. Seeds ecarunculate.—Genus of two species; Sandwith, Kew Bull. 134–136. 1950, *D. integrifolium* (Lanj.) Lanj. & Sandw. of Guiana, stamens 9.

Dodecastigma amazonicum Ducke, Notizbl. Bot. Gart. Berlin 11: 343. 1932.

Bark brown, minutely laminate; petioles 3–12 cm. long, enlarged base and apex; leaves more or less elliptic-oblong, acute at base, shortly and abruptly acuminate, 10–26 cm. long, 4–12 cm. wide, margin beneath nerviform-revolute, coriaceous, lucid above, opaque beneath, lateral nerves 10–12, prominent only beneath; panicles 3–4 dm. long, male lax, the pedicels 4–5 mm. long, flowers 6–7 mm. long, 8–11 mm. wide; female in simple racemes, pedicels 2–2.5 cm. long (–4 in fruit); calyx 6–7 mm. long, 10 mm. wide, 2 inner sepals broadly appendaged; petals obtuse; capsules tomentose; seeds 2 cm. long, 14 mm. thick.—Has been collected at São Paulo de Olivença and so to be expected within Peru. Leaves entire; stamens 14–16.

Peru (probably). Amazonian Brazil.

38. TETRORCHIDIUM Poeppig

Reference: Pax & Hoffm. Pflanzenreich IV. 147. iv: 29–32. 1912.

Small slender trees with alternate stipulate entire or dentate leaves borne on apically or subapically biglandular petioles and axillary racemes or panicles of small glomerulate (the female sometimes solitary) apetalous flowers. Floral bracts with one conspicuous gland. Male calyx with 3 broad lightly imbricate sepals, no disk, 3 episepalous subsessile barely free stamens, the broad 4-celled anthers introrsely peltate; female disk cyathiform or divided into 3 petaloid scales; ovary 2–3-celled, style short, stout, bifid, stellately spreading or nearly connate, the ovules solitary. Capsules 2–3-parted into bivalved cocci, the globose seeds deeply foveolate.—The name refers to the 4-celled stamens. Croizat has noted, Journ. Arnold Arb. 24: 170. 1943, that the author of this genus is as above, as indicated on the title page of Poepp. & Endl. Nov. Gen. & Sp. 3: 23. *pl. 227.* 1845 (not 1842).

Disk urceolate, 3-lobed; leaves prominently reticulate.
T. macrophyllum.

Disk glands free, lingulate; leaf-reticulation fine or obscure.
T. rubrivenium.

Tetrorchidium macrophyllum M. Arg. in DC. Prodr. 15, pt. 2: 1133. 1866; 30.

Resembles *T. rubrivenium* but imperfectly known; branchlets stout, appressed pubescent as the petioles, leaf-nerves and racemes with pale reddish malpighiaceous trichomes; leaves 1.5–3 dm. long, 6–10 cm. wide, shortly cuspidate-acuminate, entire, prominently reticulate-veined; female racemes 10–15 cm. long, laxly flowered, slender, naked below, the pedicels 5–7 mm. long; sepals ovate, acute, 2 mm. long, rusty pubescent without and within; disk glands connate into a 3-lobed pubescent cup; ovary 3-celled, sericeous; styles scarcely connate at base, deeply bifid, the branches slender.—The two knob-like glands at petiole tip are not quite opposite. Male racemes and flowers unknown. Said to have a milky latex. Illustrated, Mart. Fl. Bras. 11, pt. 2: *pl. 71;* also Pax, l.c. (female flowers).

San Martín: In woods near Tocache, *Poeppig 2034,* type.—Loreto: Pongo de Manseriche, *Tessmann 4188.* Ecuador.

Tetrorchidium rubrivenium Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 23: *pl. 227.* 1845; 31.

Weak tree, to 12 meters high, the younger parts early minutely appressed pubescent with simple and malpighiaceous trichomes mixed, finally glabrescent; petioles 2–4 cm. long; leaves 10–18 cm. long, 4–8 cm. wide, elliptic- or ovate- or obovate-lanceolate, acute or subobtuse, cuneately narrowed to base, entire or widely dentate, finely or not at all prominently reticulate, membranous, lustrous; secondary nerves about 7–8 each side, slender; male panicles many-flowered, much-branched, about equaling the leaves, the female racemes short, commonly half as long as the petioles; male glomerules many-flowered; female pedicels stout; flowers fulvous puberulent, the male 1.5 mm. wide, their sepals not at all or scarcely exceeding the appressed anthers, the female sepals triangular-ovate; disk glands free, lingulate, glabrous, sometimes as long as calyx; ovary 2–3-celled, pubescent or finally glabrescent; style branches subpetaloid, ovate.—The apical or subapical petiolar glands in specimens seen are opposite or one lower on same side. The

obscure *T. andinum* M. Arg., 30, of Ecuador, has glabrous ovary, entire or lobulate disk. Illustrated, Pax, l.c. p. 30.

San Martín: Woods near Tocache, *Poeppig 1915; 1951* (types). Zepelacio, *Klug 3717* (det. Standley and Croizat).—Huánuco: Río Huallaga above Cayumba, *Mexia 8322* (det. Standley). Colombia; Brazil.

39. OMPHALEA L.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v: 14–22. 1912.

Shrubs, in Peru scandent, with alternate stipulate leaves borne on petioles biglandular at apex, either oblong and pinnately nerved or cordate and 3–5-nerved and with small monoecious apetalous flowers, the female, if present, disposed in the center of the male cymules. Cymule bracts often elongate, glandular-petiolate and subfoliaceous. Disk none or obsolete. Male sepals broad, 4–5, strongly imbricate; stamens 2–3, very shortly connate at base, the stout connectives peltately and lobately connate. Ovary 2–3-celled, the styles connate into a stout column, the ovules solitary. Fruit large, fleshy without, indehiscent or finally separating into 2-valved cocci. Seeds large, nearly subglobose, ecarunculate but apparently sometimes arillate.—The name was suggested by the centrally connate stamens.

Omphalea diandra L. Sp. Pl. ed. 2: 1377. 1763; 20.

High climbing, the younger terete branches appressed scabriusculous; petioles elongating to approximately length of blades, the lustrous apical glands 2.5–3 mm. wide; leaves elliptic or orbicular-ovate, openly cordate at base, shortly cuspidate-acuminate, 15–18 cm. long, 10–13 cm. wide, coriaceous, the younger softly fulvous pubescent beneath, 3–5-nerved at base, the 2–3 secondary nerves prominent beneath; stipules acuminate, 2.5 mm. long, sometimes lobed; panicles very long, simple or with a few long branches; cymules short, usually subbiparted; bracts 1–2 (7) cm. long, narrowly lanceolate, basally biglandular; male flowers 2.5 mm. long, sepals fulvous pubescent, orbicular-ovate, concave; stamens 2; ovary pubescent; seeds of the large fruits 4.5 cm. long, 3 cm. thick, dorsally obtusely convex, the ventral side obtusely carinate.—It seems strange that this conspicuous plant apparently has been found in northern Peru only once. It is marked by the several dm. long narrow or laxly branched remotely floriferous panicles with occasional long bracts sometimes several cm. long. Illustrated, Pax, l.c. p. 21.

San Martín: Near Tarapoto, *Spruce 2415*.—Río Acre: Seringal San Francisco, *Ule 9382*. Bolivia to Central America, West Indies and Brazil.

40. NEALCHORNEA Huber

Reference: Pax & Hoffm. Pflanzenreich IV. 147. xiv. Add. 6: 51. 1919.

Nearly glabrous tree with petioled pinnate-nerved leaves and dioecious (or monoecious, Ducke) flowers, the male in puberulent panicles, the female in racemes, all with 4-merous lightly imbricate or subentire subcupulate calyx. Disk none. Stamens 10, sessile, the outer alternate with the sepals, connective longer than anthers or completely adnate. Rudimentary ovary none. Staminodia in female flowers few; ovary 2-celled; styles 2, connate only at base, simple, stout; ovules solitary. Capsules depressed. Seeds ecaruncu-late, cotyledons reniform, radicle short.—Unknown to the monographers who suggest relationship with Gelonieae, separating it from *Cunuria* Baillon by the lack of a rudimentary ovary. Ducke, Archiv. Jard. Bot. Rio Jan. 4: 107. 1925, recorded his observation made in the field that the species is monoecious or dioecious.

Nealchornea yapurensis Huber, Bol. Mus. Goeldi 7: 298. 1913; 51.

Medium-sized tree; petioles 2–10 cm. long; leaves ovate-elliptic, acute at base, abruptly and shortly caudate-acuminate, remotely crenate-dentate, 1–2 dm. long, 4–6 (8) cm. wide, subcoriaceous, reticulate-venose; male panicles to 15 cm. long, many-flowered, much-branched; bracts minute, triangular; pedicels 7 mm. long, clavate; female flowers yellowish-green, fragrant, 3 mm. broad in racemes 5–7 cm. long, the spreading pedicels 6 mm. long; sepals with large hemispheric glands at base; ovary ovoid, reddish tomentose; styles arcuately spreading, sulcate; male sepals orbicular, fleshy at base, margins scariose; capsules 3 cm. broad, half as long, seeds transverse-ovoid.—There are sometimes one or two glands on leaves beneath at base. The Río Acre material has stouter, more fulvous tomentulose pedicels than type. Illustrated, Ducke, Archiv. Jard. Bot. Rio Jan. 4: *pl. 10* (flower parts). F.M. Neg. 5407.

San Martín: Pongo de Cainarachi, *Klug 2701*.—Loreto: Yurimaguas, *Ule 6292* (det. Ducke).—Río Acre: Near mouth of Río Macauhán, *Krukoff 5278; 5607* (both det. Steyermark). Brazil; Colombia.

41. SENEFELDERA Mart.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v: 23–25. 1912.

Shrubs or trees with alternate stipulate petioled entire leaves, crowded at tips of branchlets, and small monoecious apetalous flowers in spikes panicled at the branchlet tips, the male sessile or nearly, few to each bract, the female in lower part of spikes or panicle, usually shortly pedicelled, solitary in each bract. Male calyx open well before anthesis, 3–5-lobed; stamens 3–12, the receptacle elevated, filaments short, anthers erect, extrorse; ovary rudiment none. Calyx of female flowers deeply 3-parted, the lobes imbricate. Styles connate into a short thick column, recurved-spreading above, undivided. Capsule tridymous, the endocarp of the cocci ligneous, the pyriform or irregularly subglobose seeds with small caruncle.—The male calyx ruptures irregularly, the pedicel turning toward the rachis in *S. inclinata* M. Arg. of the upper Amazon. Named for Alois Senefelder (1771–1834), lithographer of Vellozo's Fl. Flum. and said to have invented the process.

Inflorescence with many spicate branches, simulating a compound panicle.....*S. Skutchiana.*

Inflorescence open, the branches few.

Male pedicels erect, the calyx regular; petioles and leaves slightly pubescent.....*S. triandra.*

Male pedicels somewhat or in part inclined; petioles and leaves glabrous.....*S. inclinata.*

Senefeldera inclinata M. Arg. in Mart. Fl. Bras. 11, pt. 2: 530. 1874; 25.

Glabrous tree with smooth terete branchlets, their apically crowded leaves on very unequal petioles, these typically 1.5–4 cm. long, apically subglandular-tumidulous; leaves broadly obovate-lanceolate, narrowed to base, acuminate or obtusish and cuspidately acuminate, usually 1.5–2 dm. long, 5–7 cm. wide, coriaceous, lustrous, prominently 12–14-nerved and reticulate, minutely maculate-biglandular nearly at the base beneath; male calyces strongly inclined at least in type, subirregular, 2–3-parted; stamens 7–10, receptacle moderately elevated; capsules 15 mm. long, smooth, black, the seeds 8–10 mm. long and broad.—*S. macrophylla* Ducke, Archiv. Jard. Bot. Rio Jan. 4: 113. 1925, in view of the Peruvian collections may be designated *S. inclinata* var. **macrophylla** (Ducke) Macbr., comb. nov., differing typically as noted by the author in the larger

leaves, these usually 1.5–3 dm. long, 7–12 cm. wide and the much longer petioles (5–14 cm. long); these characters vary greatly in Peru material determined *S. macrophylla* by Mansfeld, who noted "toward *S. inclinata*." F.M. Negs. 5412; 5414 (*S. macrophylla*).

Loreto: Mishuyacu near Iquitos, *Klug 109; 376*. Amazonian Brazil.

Senefeldera Skutchiana Croizat, Journ. Wash. Acad. Sci. 33: 18. 1943.

Entirely glabrous medium-sized tree; petioles 2.5–8 cm. long, slightly enlarged apically, drying blackish; leaves entire, broadly elliptic, broadly cuneate to subrotund at base, short-acuminate to apiculate, slightly glandular at end of midrib where a little reflexed, chartaceous to subcoriaceous, drying greenish, glands obsolete but base of blade sometimes obscurely spotted above; nerves 10–14 pairs, prominent both sides; inflorescence apical with numerous spiciform rigid axes, about 2 dm. long and wide, simulating a compound panicle; male flowers many, the fewer female basal or scattered, the former usually in 3's in axil of ovate bractlet 1.5–2 mm. long, the margin erose-hyaline; in upper axils only middle flower maturing; female flowers with 3 lanceolate entire imbricate bracts, glandular at base within, 1.5–2.5 mm. long, with an occasional lateral male flower; ovary subfusiform to 2 mm. long; styles fleshy, scarcely divided.—Distinctive in inflorescence (Croizat).

Huánuco: Tingo María, *Skutch 4967*, type; also *4961*.

Senefeldera triandra Pax & Hoffm. Pflanzenreich IV. 147. xiv. Add. 6: 55. 1919.

A 2–8-meter shrub with glabrous branchlets but the apically and basally tumidulous petioles (1.5–4 cm. long) sparsely malpighiaceous pubescent; stipules caducous, subulate, 2–3 mm. long; leaves elliptic, acuminate, base acute, 13–15 cm. long, 5–6.5 cm. wide, membranous, finely reticulate on both sides, sparsely pilose and glandular beneath near margins; inflorescence glabrous or nearly, 4 cm. long, branches nearly 1.5 cm. long, lower female flowers 2–3, sessile, the calyx 1.5 mm. long; male part about 1 cm. long, broad bracts acuminate, biglandular, male pedicels nearly 1 mm. long, erect; calyx 0.5 mm. long, glabrous, 3-lobed; stamens 3; styles 3, barely connate at base, arcuate-recurved; ovary glabrous.—*S. multiflora* Mart. (or apparently correctly *S. verticillata* (Vell.) Croizat, Journ. Wash. Acad. Sci. 33: 18. 1943) of the upper Amazon, has

glabrous coriaceous leaves, longer inflorescences, 5–8 stamens. F.M. Neg. 5413.

Río Acre: Seringal San Francisco, *Ule 9547*, type.

42. MABEA Aublet

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v: 26–42, 282. 1912.

Lactescent trees or shrubs sometimes scandent or the branches so, the leaves alternate, about oblong, entire or denticulate, stipulate, shortly petioled, with the flowers numerous in terminal sometimes paniculate racemes, the bracts usually biglandular; female flowers few at base of raceme, with solitary bract. Petals and disk none. Male flowers with young calyces globose opening long before anthesis, the 3–5 lobes lightly imbricate, 10–70 stamens, rarely only 2 or 3, affixed to convex receptacle, anthers nearly sessile, extrorse, longitudinally dehiscent, ovary none. Female flowers with 5 (rarely 6 or 3) imbricate often unequal sepals, 3-celled ovary, the styles free above, undivided, ovules solitary. Capsules globose, breaking into bivalved follicles with carunculate ovoid smooth seeds.—Specific definition within this group is not yet established; the presence or absence of sepalar glands, for example, unless a concomitant character, is surely open to question as taxonomically significant.

Leaves often multiglandular along margin beneath; male flowers umbellate in narrow panicles.

Leaves firm, the marginal glands often obscure; anthers 12–15. *M. nitida.*

Leaves membranous, the marginal glands prominent; anthers 15–25 ..... *M. Macbridei.*

Leaves eglandular or glands few, scattered along margin; male flowers if umbellate in panicles several cm. wide.

Male flowers umbellate in panicles several cm. wide.

Pedicels conspicuously globose-glandular at base. . *M. Standleyi.*

Pedicels if conspicuously glandular clearly so above the base; species not proved.

Plants glabrous to the panicles, these about 3 cm. wide. *M. maynensis.*

Plants more or less furfuraceous, at least the branchlets and panicles, these mostly much wider than 4 cm. . *M. elata.*

Male flowers racemose or spicate in racemiform panicles about 1 cm. wide, or, rarely, racemose.

Male flowers racemulose on short branchlets.....*M. anadena.*

Male flowers 1–3 in axils of bracts on the rachis..*M. subsessilis.*

Mabea anadena Pax & Hoffm. Pflanzenreich IV. 147. xiv. Add. vi: 55. 1919.

Branchlets compressed and, as the 8–12 mm. long petioles, reddish scurfy, becoming terete and glabrescent; stipules caducous; leaves lanceolate, acute at base, abruptly acuminate, 8–11 cm. long, 22–33 mm. wide, serrate, membranous, lustrous above, opaque beneath and scurfy on the 10–14 veins; panicles 6–10 cm. long including the 1–2 cm. long furfuraceous peduncles; male branchlets dense, to 8 mm. long, racemes 4–6-flowered with ovate eglandular paucidenticulate bracts, the flowers 2–2.5 mm. wide with 13–15(–19) stamens; sepals of female flowers 6, ovate-acuminate, about 3 mm. long; ovary reddish pubescent, style column 4.5(–9) mm. long, free part to 7 mm. long.—In section Spiculigerae but bracts eglandular (authors). In Krukoff specimen stamens to 19, style column twice as long, sepals 3.5–4.5 mm. long (Steyermark). Tree, 10–30 meters high. F.M. Neg. 5415.

Río Acre: Seringal San Francisco, *Ule 9548*, type. Mouth of Río Macauhán, *Krukoff 5430*. Bolivia.

Mabea elata Steyerm. Field Mus. Bot. 17: 418. 1938. *M. rhynchophylla* Diels, Notizbl. Bot. Gart. Berlin 14: 335. 1939.

Branchlets brownish furfuraceous; stipules wanting; leaves oblong-elliptic, obtuse at base, abruptly caudate-acuminate, 8.5–20 cm. long, 2.5–6.5 cm. wide, subentire, subcoriaceous, glabrous or the midrib above and near tip scurfy puberulent, superficially puberulent beneath, lateral nerves 15–17 pairs; panicles 11–17 cm. long, 4–5.5 cm. wide, rachis pubescent; sepals all puberulent; male pedicels in racemose umbels, with bracts 4–5 mm. long, 1.5–2 cm. long, biglandular 2–3 mm. above the base, the glands black, 3–4 mm. long, half as thick, ashy puberulent; sepals round, stamens 50–60; female sepals 4.5–7 mm. long, interior longer than exterior, acuminate, all glandular both sides, black without; style column 8 mm. long, tomentulose; styles 12 mm. long.—The glandular inner surface of the female sepals places this in the section Intermediae. But the character is not clear and its constancy may be questioned; certainly the species otherwise resembles *M. eximia* Ducke, Archiv. Jard.

Bot. Rio Jan. 4: 107. 1925, to which the careful Mansfeld referred *Klug 43*, "vel valde aff." and which in turn as noted by Ducke is near *M. pulcherrima* M. Arg., 32, of French Guiana; *M. eximia* however as to type has 100–120 stamens, *M. pulcherrima* about half as many, that is as to type. *Klug 43* seems to be intermediate and until the validity of these several characters is further proved may as well be included here. Another closely related species, *M. speciosa* M. Arg., 31, recently is said to have been found as near as São Paulo de Olivença and would be sought here; it has leaves fuscous-glaucous beneath, panicles 3.5–4 cm. wide, sepals all eglandular, stamens about 65. These forms seem to be very narrow indeed and perhaps will prove to comprise at most two species. *M. Klugii* Steyerm. l.c., 416, of the upper Putumayo, Colombia, has persisting sepals, 25–30 stamens. Type a 10-meter tree and is the same fide Croizat, Caldasia 2: 360. 1944, who has pointed out that short branchlets present differences of leaves and inflorescences not apparent on adult branches.

Loreto: Between Balsapuerto and Moyobamba, *Klug 3206*, type (also for *M. rhynchophylla*). Mishuyacu, *Klug 43?* Ecuador; Colombia?

Mabea Macbridei Johnst. Contr. Gray Herb. 75: 27. 1925.

A small tree with early pulverulent slender subangled branchlets; petioles 9–12 mm. long; leaves oblong or elliptic-oblong, 12–18 cm. long, 4.5–6 cm. wide, glabrous, lightly crenate, lustrous above, glaucous beneath, the veins conspicuous and with about 30 minute lineately marginal glands toward the abruptly acuminate and obtuse tip, rounded or obtuse at the eglandular base; panicles terminal (sometimes branched), ferrugineous-tomentulose, about 1 dm. long, 10–12 mm. wide; bracts lanceolate; pistillate branchlets 1 mm. long, 1-flowered, staminate 1–2 mm. long, 2–4-flowered, obscurely glandular at base, the pedicels of female flowers 7 mm. long, canescent-strigose, those of the male 5–10 mm. long, sepals of former orbicular or acutely ovate, puberulent, 1–1.5 mm. long, eglandular, the ovary merely tomentose with style column 5–7 mm. long, styles as long; male flowers with calyx 2 mm. wide, deltoid lobes, 15–25 stamens, sparsely pubescent anthers.—The peculiar submarginal row of glands distinguishes this from all South American species except *M. nitida* Benth., 39, of the upper Amazon with different inflorescence; *M. maynensis* also differs in the panicles (Johnston). I have not seen authentic material of *M. nitida* but ex char. and photograph

it appears to have firmer more lustrous leaves and the 12–15 anthers are described as pulverulent.

Junín: Hacienda Schunke above La Merced, *5702*, type; *Schunke A106*.

Mabea maynensis M. Arg. in DC. Prodr. 15, pt. 2: 1150. 1866; 32.

Glabrous to the panicles; branchlets early compressed, slender; petioles 12–15 mm. long; leaves lanceolate-elliptic, subacute at base, abruptly and shortly acuminate, 9–14 cm. long, 3.5–7 cm. wide, repandly crenate, reticulate-veined, secondary veins 10–15; panicles about a dm. long, 3 or 4 cm. wide, male branchlets 4–5 mm. long, umbellately 2–3-flowered, coarsely biglandular well above the base, pedicels 1–1.5 cm. long, calyx pulverulent, nearly 3 mm. wide, with semiorbicular lobes; stamens 33–40, connective apically crenulate, pubescent; female pedicels 2–3 cm. long, sepals acuminate, 3 mm. long; bracts reddish-puberulent, eglandular, as the ovary, this smooth, tomentulose; style column nearly 2 cm. long, the free parts about two and a half times longer.—*M. caudata* Pax & Hoffm. l.c., 282, of British Guiana, to which Mansfeld referred *Tessmann 4275*, has rather ovate leaves 11–15 cm. long, 5.5–9 cm. wide, about 30 stamens, style column 22–25 mm. long; it seems to be doubtfully distinct, at least specifically. F.M. Neg. 5424.

San Martín: Tarapoto, *Spruce 4888*, type. Pongo de Cainarachi, *Klug 2721* (det. Croizat).—Loreto: Lower Río Huallaga, *Williams 3903* (det. Croizat). Mouth of the Río Santiago, (*Tessmann 4275*). Amazonian Brazil; British Guiana?

Mabea nitida Spruce ex Benth. in Hook. Journ. Bot. Misc. 6: 367. 1854; 39.

Glabrous to the pulverulent or glabrate panicles, these only 1 cm. wide or narrower, the umbellately 3-flowered male branchlets very short, typically scarcely longer than the calyces, eglandular bracted a little above the base; branchlets slender, lustrous, dark; petioles 7–10 mm. long; leaves oblong-elliptic, obtuse or subacute at base, subabruptly and shortly caudate-acuminate, (8) 12–17 cm. long, 3–5 cm. wide, lustrous above, glaucous-opaque beneath, the marginal glands several or nearly lacking; male pedicels unequal, the longer middle one scarcely more than 2 mm. long, the calyx not that broad and with 12–15 pulverulent anthers; sepals of female flowers eglandular; ovary pulverulent, the carpels geminately bimuricate; capsules

globose, intensely rufous-pulverulent, smooth or minutely muricate, 16 mm. large, the obscurely olive-black seeds 1 cm. long, 8.5 mm. broad.—Trees 10–20 meters tall with abundant latex (Klug). F.M. Neg. 5425.

Loreto: Mishuyacu near Iquitos, *Klug 1442*. Amazonian Brazil.

Mabea Standleyi Steyerm. Field Mus. Bot. 17: 417. 1938.

Glabrous except the panicles, these puberulent; branchlets olive-brown; petioles 8–10 mm. long; leaves oblong or elliptic-oblong, obtuse at base, abruptly acuminate, 12–20 cm. long, 5.5–6.5 cm. wide, subentire, the 11–12 pairs of lateral nerves conspicuous beneath; stipules of flowering branches persisting, linear-setaceous, about 1 cm. long; panicles about 1 dm. long, 2.5 cm. broad, male pedicels 10–13 mm. long with 2 globose glands at very base 2–2.3 mm. in diameter, sepals rounded, purplish-puberulent; stamens 60–65; female sepals 2.5–3.5 mm. long, acuminate, eglandular within; style column puberulent, about 2 cm. long, the recurved styles 6 mm. long.—Forest shrub 2 meters high of section Umbelluliferae, near *M. speciosa* M. Arg., 31, but that as all other species of the section without the orbicular glands next to the panicle rachis (the author).

Loreto: Florida, mouth of the Río Zubineta, *Klug 2064*, type.

Mabea subsessilis Pax & Hoffm. Pflanzenreich IV. 147. v: 282. 1912.

Small tree, the rusty puberulent slender branchlets tardily glabrescent; petioles puberulent, 1–2 mm. long; leaves oblong-lanceolate or in type broadly lanceolate, cordate or subcordate at base, abruptly caudate-acuminate, in type 6–10 cm. long, 2–3.5 cm. wide, mucronulate, coarsely uncinate-serrate, lustrous above, subglaucescent beneath, firm-membranous, reticulate-veined both sides; stipules subpersisting, glabrous, 5 mm. long, subulate-attenuate; panicled inflorescence composed of about 4 racemes 3–4 cm. long, only the 2–3 basal flowers female; rachis and bracts pubescent, the broadly ovate acuminate male minutely glandular at base, the narrower female eglandular, the former with 3 flowers on pedicels 1–1.5 mm. long, the solitary pedicels of the latter 3–4 mm. long; male flowers 1 mm. wide or smaller; stamens about 10; female sepals 6, acuminate, unequal, 1.5–2 mm. long, at least one denticulate; ovary smooth, reddish-furfuraceous; style column to 7 mm. long, pubescent; capsules puberulent, 15 mm. long.—Section Apodae Pax & Hoffm. characterized by the male pedicels ternate in bracts on

the rachis and according to the authors nearest *M. crenulata* Sp. Moore, 39, also from southern Brazil but "very diverse"; it and *M. indorum* Sp. Moore, 40, similar but male pedicels to 4 mm. long have crenulate leaves acute or little rounded at base, obtuse to shortly cuspidate. Determinations by Mansfeld as *M. subsessilis* but as the Peruvian form is remote geographically and differs slightly it may be worth while to note it as *M. subsessilis* var. **peruviana** Macbr., var. nov., foliis oblongis 1–2.5 cm. latis minute serrulatis subtus obscure reticulato-venosis; pedicellis circa 2 mm. longis; capsulis 18–20 mm. longis. Type, *Klug 555*. Williams, Field Mus. Bot. 15: 279. 1936, gives the anatomy, noting the wood as light and soft, suitable for carpentry; sometimes 15 meters tall. F.M. Neg. 5428.

Loreto: Mishuyacu near Iquitos, *Klug 269; 555; 701; 847*. Lower Río Nanay, *Williams 653*. Tierra Doble, *Williams 896*. Brazil. "Amaquillo," "manchinga blanca" (both, Williams).

43. **SEBASTIANIA** Spreng.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v: 88–153. 1912, and Add. 6: 58. 1919.

Usually more or less shrubby, sometimes arborescent, rarely completely herbaceous and annual, the shortly petioled leaves ordinarily alternate, small, rigid and serrulate; stipules small. Flowers small, apetalous, usually monoecious and in slender often entirely male spikes commonly borne in leafy terminal branchlets or opposite the leaves; bracts basally biglandular; female flowers most frequently few or solitary at the base of the male. Disk none. Male calyx often 3-lobed or -parted, the somewhat larger female with 3 sepals. Stamens 3, 2 or exceptionally 4, free or connate basally, the anthers longitudinally dehiscent. Ovary 3(2)-celled, ovules solitary, styles spreading or revolute, undivided, rarely connate. Capsules tridymous or subglobose, smooth or armed, separating from central column into bivalved cocci with oblong subglobose or cylindric carunculate seeds.—Commemorates Antonio Sebastiani, professor of botany and physician of Rome (1782–1821).

The "brincadores" or Jumping Beans are often the seeds of a Mexican species, similar to the Peruvian *S. obtusifolia*, that have become inhabited by a larva which by its movements causes the seeds to stir or even jump; Pax and Hoffmann, Pflanzenreich l.c. 147–148, give a detailed account (with bibliography) of this popular subject.

Annual, sometimes lignescent at base; spikes opposite leaves.
S. corniculata.

Shrubs or trees; spikes axillary or terminal.

Petioles 3–5 mm. long; obtuse or barely acute.

Branches terminating in long sharp spines.....*S. haploclada.*

Branches not modified into spines.....*S. obtusifolia.*

Petioles about 10 mm. long; leaves shortly acuminate.
S. huallagensis.

Sebastiania corniculata (Vahl) Pax, Pflanzenreich IV. 147. v: 96. 1912. *Tragia corniculata* Vahl, Eclog. Amer. 2: 55. *pl. 19.* 1798.

Annual herb or sometimes becoming more or less lignescent at base, the branching stems often 1–several dm. high, pilose-hispid or glabrate; petioles slender, often 1 cm. long or longer; leaves ovate-lanceolate, rounded-cordate at base, acuminate, usually 3–4 cm. long, 1–2 cm. wide, subentire or with small incurved whitish teeth and with a few marginal glands near the base beneath where often more or less pilose; male spikes opposite the leaves 1–2 cm. long, the slender rachis pilose or glabrate; bracts minute, 3–5-flowered, 3-lobed; larger female flowers usually solitary at base of male spikes or below and opposite leaves, their sepals denticulate and basally stipitate glandular; ovary subglobose, rather irregularly 6-muricate, the capsule about the truncate base and apex with 6 wing-like appendages, finally 5 mm. long; seeds 2 mm. long, subcylindric, dark gray.—Illustrated, Pax, l.c. p. 97. F.M. Neg. 21566.

Peru (probably). Mexico and the West Indies to Colombia and eastward.

Sebastiania haploclada Briq. Ann. Cons. Jard. Bot. Genève 4: 231. 1900; 131.

Shrub or tree with stout branches terminating in a sharp spine as much as 5 cm. long; petioles 3–5 mm. long; leaves elliptic-obovate, cuneate to short petioles, obtusely rounded or subobtuse, about 1 cm. wide, 3 cm. long, entire, hard-coriaceous, green and somewhat lustrous, glabrous but glandular, with 5–6 little or scarcely prominent lateral nerves; male spikes 2–3 cm. long terminating short leafy branchlets, the rachis stout; bracts ovate, entire or nearly, 3-flowered; male and female sessile or subsessile, the parts minute, ovate; anthers large, orange, long-separated; styles elongate.—Not seen by Pax, who does not distinguish it from *S. pachystachys* M. Arg.,

129, of southern Brazil; Briquet allied it to the more widely distributed *S. Klotzschiana* M. Arg.; except for the spinescent branches its resemblance to *S. obtusifolia* is striking. F.M. Neg. 24565.

Amazonas: Chachapoyas, *Mathews*, type.

Sebastiania huallagensis Croizat, Journ. Arnold Arb. 24: 177. 1943.

Entirely glabrous tree, even the young shoots; petioles 8–10 mm. long; leaves elliptic-lanceolate, base shortly cuneate and at juncture with petiole with 2 dark-colored glands beneath, rather abruptly acuminate, entire, 6–9 cm. long, 2.5–3.5 cm. wide, with about 10–14 pairs of slender nerves; inflorescences slender, bisexual, to 8 cm. long, the male flowers 6–8, about 1.5 mm. wide, perianth minute, subsessile, 3-lobulate, the 3 stamens alternate, lobes basally connate; female flowers solitary on pedicels about 5 mm. long; ovary smooth, 4 mm. long, 1.5 mm. broad, basally enclosed with 3–5 imbricate bracts, the 2–3 scarcely slender styles divergent.—Distributed as *Alchornea* sp. which it certainly is not; the sum of the characters suggests *Sebastiania* but better material is needed to confirm this disposition (Croizat). Compare however *S. brasiliensis* Spreng., 138, which it resembles greatly at least in general character, except that in that species typically the male bracts are 3(16)-flowered and the leaves are eglandular. Bolivian material, however, so determined seems to be the same as *S. huallagensis* but of course may be incorrectly named.

San Martín: Juanjuí, Alto Río Huallaga, *Klug 4243*, type.

Sebastiania obtusifolia (HBK.) Pax & Hoffm. Pflanzenreich IV. 147. 5: 149. 1912. *Sapium obtusifolium* HBK. Nov. Gen. & Sp. 2: 63. 1817.

An entirely glabrous 2-meter shrub with rigid terete branches but the densely leafy branchlets angled in drying; petioles 3–5 mm. long; leaves usually lanceolate-obovate or -spathulate, acute or cuneate at base, rounded-obtuse or subacute, 2–4.5 cm. long, 10–18 mm. wide, entire or scarcely crenulate, eglandular, subcoriaceous, the very fine secondary nerves hardly conspicuous; stipules broad at base, denticulate, long subulate-acuminate, minute; spikes terminal, 3–4 cm. long, dense, rigid, with one sessile female flower at base or none; bracts ovate, acute or acuminate, lightly denticulate, with smooth orbicular glands at each side, the 3 male flowers subsessile; male sepals 3, narrow, subulate, the acuminate female

eglandular within and longer than the smooth glabrous ovary; stamens 3; styles columnarly connate; capsules 15 mm. long, 2 cm. wide, the globose-ovoid seeds 6 mm. thick.—The latex is used medicinally (Vargas).

Cajamarca: In woods at Querecotillo, *Humboldt*, type. Huari, Chavin de Huanter in the valley of the Río Pucha, *Weberbauer 3739*.—Libertad: Angasmarca, 3,300 meters, *Weberbauer 7088*.—Junín: Huasahuasi, *Ruiz & Pavón*. Tarma, *Weberbauer 1752*. Chanchamayo, *Isern 2332*.—Apurímac: Andahuaylas, *Vargas 8803*. Curahuasi, *Vargas 9613* (det. Standley). "Vinagrillo" (Vargas).

44. STILLINGIA Garden

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v: 180–199. 1912.

Like *Sapium* but, especially, the base of the pericarp persisting between the bivalvate cocci, these usually 3, leaving a 3-radiate receptacle, the columella, if developed, more or less winged. Leaves glandular-serrulate, often biglandular at tip of short petioles, sometimes opposite.—As remarked by the monographers the group is usually not distinguishable from *Sapium* unless the species are in fruit; Otto Kuntze treated it as a section and his interpretation could well be followed, at least in floristic works. The name commemorates Benjamin Stillingfleet, an English botanist (1702–1771).

Stillingia salpingadenia (M. Arg.) Huber, Bull. Herb. Boiss. sér. 2. 6: 452. 1906; 188. *Sapium salpingadenium* M. Arg. Linnaea 32: 121. 1863. *Excoecaria salpingadenium* M. Arg. in DC. Prodr. 15, pt. 2: 1209. 1866.

Branches short, densely leafy; petioles 2–5 mm. long, leaves 4–9 cm. long, 1–2 cm. wide, elliptic, lanceolate or linear-lanceolate, acute or subobtuse both ends, densely and acutely callous serrulate, minutely puncticulate, rigid-coriaceous, slightly lustrous above, paler beneath, cartilaginous-margined, nerves prominent both sides; stipules subulate, caducous; spikes terminal, 4–5 cm. long, all male or female at base, broadly acuminate, 3–9-flowered, with large cupuliform glands, flowers sessile, calyx of male 2-lobed, the female with three ovate cuspidate subdenticulate sepals; stamens 2; styles very shortly connate; capsules smooth, 10 mm. long and broad, cocci 8–9 mm. wide; seeds smooth, subglobose, 6 mm. long, caruncu-late.—The determination of the Peruvian material is doubtful but

placed here by Standley; for identification it may be designated var. **peruviana** Macbr., var. nov., petiolis 2.5 mm. longis; foliis 2–3.5 cm. longis, 7–10 mm. latis, margine obscure calloso-serrulatis; bracteis non valde glanduligeris; styli recurvo-patuli. The spikes too are shorter than described for this species and according to collectors deep blood-red in color; if Standley is correct in placing the shrub in this genus it may well prove to be new. Fruit said to be edible. Illustrated, Pflanzenreich l.c. p. 189.

Huancavelica: South of Mejorada in river shrubland, 2,500 meters, *Stork & Horton* (type, var.). Bolivia; Paraguay. "Cabra-cabra" (Stork & Horton).

45. SAPIUM P. Brown

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v. 199–258. 1912, and Add. 6: 60–61. 1919.

Glabrous trees or shrub with actually alternate entire or denticulate or often marginally glandular leaves and commonly terminal spikes of small usually monoecious apetalous flowers, the female ordinarily few at the base. Disk none. Calyces 2–3-lobed or dentate or the female sometimes 2–3-parted or tubular. Stamens 2–3, free or partly connate, exserted; anthers 2-celled, longitudinally dehiscent. Ovary 2–3-celled; ovules solitary; styles free or shortly connate, recurved-spreading, deciduous. Capsules globose, pyriform or composed of 3 cocci, ligneous or subdrupaceous, variously dehiscent or often indehiscent, sometimes 1-seeded.—Acknowledgment with appreciation is made to Croizat, Journ. Arnold Arb. 24: 173–177. 1943, and Caldasia 2: 131–134. 1943, for his careful observations in this group the species of which as proposed will not be understood until much more study of complete materials.

As indicated below, various species are a source of rubber.

Petioles all or mostly 2–3 cm. long (1–5 cm.).

Leaves entire or essentially, about half as wide as long.

Leaves plane or nearly even to tip, large (often 6 cm. wide); petioles elongate (2–5 cm.).....*S. marmieri.*

Leaves mostly more or less cucullate or inflexed at tip; petioles often less than 3 cm. long.

Leaves as to type described as metallic lustrous above. *S. aerium.*

Leaves dull, apparently never metallic lustrous above. *S. taburu, S. glandulosum.*

Leaves entire, about one-third as wide as long, inflexed at tip. *S. Poeppigii, S. aereum.*

Leaves somewhat serrulate, sometimes obsoletely, about one-third as wide as long, plane.

Petiolar glands linear, immersed.....*S. utile.*

Petiolar glands lacking or obscure.....*S. eglandulosum.*

Petioles all or mostly 1 cm. long (7–12 mm.).....*S. Martii.*

Sapium aereum Klotzsch ex M. Arg. Linnaea 32: 119. 1863; 233.

Similar to *S. marmieri* but the smaller lustrous leaves a submetallic greenish color above in type, paler beneath, oval-oblong, subcuneate at base, rounded at apex where thicker and cucullately introflexed, somewhat glandular and revolute marginally, about 10–12 cm. long, 4–4.5 cm. wide, the slender secondary nerves arcuate; petioles 1.5–3 cm. long, the apical glands cylindric, conspicuous or in type conic-ovoid, small; flowers unknown in type but in following material like *S. Poeppigii;* ovary enlarged at base, crowned with the 3-lobed deciduous style; capsules about 1 cm. long, 3-celled; seeds subglobose, compressed, tuberculate, 5–6 mm. broad.—Croizat has suggested that the fruit may be larger and slightly different in shape than that of *S. glandulosum,* but information as yet is lacking on this character; he also says that it differs from *S. marmieri* primarily in its leaves on the whole being smaller and narrower, in which case my first key character (after Pax) is not valid, but ex negative the second is and thus the species name is probably the earlier for *S. Poeppigii. S. taburu* could also be included here. The petiolar glands are evidently variable in development. Croizat has referred from neighboring regions of Brazil *Krukoff 6158; 6296; 6307* and *8311.* Illustrated, Hook. Icon. *pl. 2682.* F.M. Neg. 5519.

The white latex is used as an adulterant of *Hevea* rubber (Seibert).

Huánuco: Pampayacu, *Kanehira 28* (det. Johnston, *S. glandulosum*).—Junín: Vitoc, *Ruiz & Pavón,* type. La Merced, *Weberbauer 1937.*—San Martín: Zepelacio, *Klug 3374.* San Roque, *Williams 7351.*—Loreto: Santa Rosa, *Williams 4771* (det. Steyermark, *S. Poeppigii*). La Victoria, *Williams 2865* (det. Standley, *S. glandulosum*). Río Ucayali, *Seibert 1886* (det. A. C. Smith, *S. Pavonianum*). Amazonian Brazil. "Shiringa rana" (Seibert), "guta percha" (Williams).

Sapium eglandulosum Ule, Tropenpfl. 9, Beih. 6: 14. 1905, and Bot. Jahrb. 35: 673. *pl. 2.* 1905; 206.

Tree 5–15 meters high with rigid flowering branchlets; petioles 2–3 cm. long sometimes glandular apically; leaves oblong-lanceolate, acute both ends, the terminal gland not inflexed, entire, lustrous, 10–16 cm. long, 4 cm. wide, the subhorizontal numerous secondary nerves inconspicuously reticulate; spikes unisexual, the stout terminal male 1–2 dm. long, with much shorter (but only young known) female (about 3) borne at their base; bracts (male) broadly ovate, obtuse, biglandular, 10–15-flowered; calyx bilobed; stamens 2; ovary 3-celled; seeds corrugate.—Not clearly distinct from *S. marmieri* unless in leaf shape, which resembles more that of *S. utile.* Illustrated, Ule, l.c. and Pax, l.c. p. 207.

The sap is said to provide a rubber.

Huánuco: Huamalíes, between Monzón and the Huallaga, *Weberbauer 3578* (probably but sterile, Pax). Without data, *Weberbauer*, fide Pax. Brazil.

Sapium glandulosum (L.) Morong, Ann. N. Y. Acad. Sci. 7: 227. 1893; 231. *S. Hippomane* G. F. W. Mey. Prim. Fl. Esseq. 275. 1818 as to authors, the name fide Croizat, Journ. Arnold Arb. 24: 176. 1943, being a new name for *Hippomane biglandulosa* L.

Shrub or tree attaining 20 meters; petioles canaliculate, 7–30 mm. long, biglandular a little below the apex with straight, recurved or incurved glands 2–3 mm. long; leaves elliptic or oblong-lanceolate, rounded or cuneate at base, abruptly acuminate, the tip itself more or less cucullately inflexed, subentire, subcoriaceous, commonly 4–15 cm. long, 3.5–8 cm. wide, or those on sterile branches much larger, acute, serrulate and somewhat glandular; secondary nerves very numerous, slightly arcuate and as the veins prominent; spikes terminal, 7–25 cm. long, slender, androgynous or entirely male; bracts greatly reduced with an oval gland both sides, the male 6–9-flowered, the calyx of these purplish, bilobed, that of the female 3-parted; stamens 2; styles 3, connate at base; capsules sessile, globose, 7–9 mm. long; seeds sublenticular, 5–6 mm. long and broad with red membranous cover and deciduously tuberculate.—Illustrated, Hook. Icon. *pl. 2650* (as *S. aucuparium*).

The lactescent sap according to Ule provides a high class rubber. Williams found the tree attaining 40 meters with spreading crown and straight cylindrical trunk 5 dm. or more in diameter, the yellowish-white or brown bark with coarse ridges, the latex sweet, pinkish,

the wood not durable (Field Mus. Bot. 15: 282. 1936). Probably not in strict sense in Peru as suggested by Croizat but the several names may represent variants of less than specific importance.

Junín: La Merced, Chanchamayo Valley, *Weberbauer 1929* (det. Pax).—Huánuco: Upper Amazon, *Kanehira 12* (det. Johnston).—Loreto: Fortaleza, *Williams 4403*. Yarina Cocha, *Tessmann 3404* (det. Mansfeld). Puerto Meléndez, *Tessmann 4790* (det. Mansfeld). To the West Indies. "Gutapercha" (Williams), "milk tree," "steringarana" (Tessmann).

Sapium marmieri Huber, Bot. Mus. Paraense 3: 397. 1902; 256.

A 20-meter tree with smooth gray bark, stout branches, nigrescent branchlets; stipules broadly ovate, acute; petioles 3–5, usually 4 cm. long, slender, terete but lightly canaliculate above, faintly biglandular below the middle; leaves oblong-elliptic (apparently sometimes shortly so), rounded base and apex or the latter obtusish or slightly emarginate, 10–12 or sometimes 8 or 15 cm. long, 5–7 often 6 cm. wide, entire or little undulate, lustrous above, opaque beneath; secondary nerves 15–20, arcuate; male bracts 3-flowered, triangular or orbicular, the large glands obovate or subreniform; male calyx bifid; capsules 8 mm. in diameter; seeds rugose. Illustrated, Hook. Icon. *pl. 2899*. F.M. Neg. 24577.

The abundant milky sap is very poisonous and produces a less valuable rubber for which it is used in Ecuador (Huber). Determinations by Croizat. Most of the specimens have dried a reddish-brown color.

Loreto: Alluvial soils of the Ucayali and Huallaga, (*Huber*, type), *Tessmann 3234*. Alto Río Itaya, *Williams 3490; Killip & Smith 29285*. Lower Río Huallaga, *Williams 4904; 4898; 4789; 4626; Killip & Smith 29265*.—Río Acre: Mouth of Río Macauhán, *Krukoff 5717* (det. Steyermark). Brazil; Colombia. "Seringa rana," "seringueria," "shiringa masha," "caucho masha," "pampa caucho," "gutapercha."

Sapium Martii (M. Arg.) Huber, Bull. Herb. Boiss. sér. 2, 6: 448. *fig. 42*. 1906; 210. *Excoecaria Martii* M. Arg. in Mart. Fl. Bras. 11, pt. 2: 614. 1874.

Much-branched; stipules fulvous, triangular hastate at base, lacerate-dentate, scarious except the nerves; petioles to 12 mm. long, thick, glabrous, biglandular at tip; leaves oblong-elliptic, shortly and acutely acuminate both ends, concolorous, chartaceous, 5–8 cm.

long, 2–3.5 cm. wide; secondary nerves 12–15, prominent as the reticulate veins; spikes terminal, bracts semi-orbicular, male 10-flowered, with a large orbicular gland both sides; female calyx sessile, tubular, obtusely 3-lobed, the short lobe semi-orbicular, style shortly 3-parted; capsules about 7 mm. long, seeds tuberculate, subglobose, 4 mm. thick.—Perhaps a variant of the Brazilian *S. obovatum* (M. Arg.) Klotzsch with coriaceous stipules and leaves. The Peruvian shrub which furnishes description of fruit and is placed here ex char. seems to have thinner leaves slightly cucullate at tip and for convenience may be noted as var. **peruviana** Macbr., var. nov., foliis chartaceis apice obscure incurvis. F.M. Neg. 19538.

San Martín: Tarapoto, *Williams 6658*. Juan Guerra, *Williams 6909*.—Loreto: Iquitos, *Williams 8032*. Brazil; Ecuador?

Sapium Poeppigii Hemsley in Hook. Icon. *pl. 2678*. 1901; 229. *Sapium biglandulosum* (Aubl.) M. Arg. var. *hamatum* [Poeppig] M. Arg. Linnaea 32: 116. 1863. *S. hamatum* ([Poeppig] M. Arg.) Pax & Hoffm. Pflanzenreich IV. 147. v: 229. 1912.

Flowering branchlets stout; stipules squamiform, persisting; petioles to 2.5 cm. long with 2 subglobose glands at the apex; leaves oblong or elliptic-oblong, rounded both ends or shortly contracted just at base, the introrsely cucullate tip with a large gland, 9–12 cm. long, 4–5 cm. wide, lustrous above, paler and opaque beneath, merely subcoriaceous, obscurely crenulate and glandular, the many secondary slender nerves arcuate-ascending; spikes terminal, androgynous or all male, 8–10 cm. long, usually with 12–15 basal female flowers; bracts broadly triangular with oblong glands, the male 5–7-flowered, these with bilobed calyx, that of the female 3-parted; stamens 2; ovary 3-celled, sessile; styles 3, nearly free, not persisting. Croizat notes that the leaves are narrower, longer and thinner than are those of *S. marmieri*. It seems to be the same as *S. aereum*, or very similar. The white latex is used as an adulterant of *Hevea* rubber (Seibert). Illustrated, Pax, l.c. p. 227.

Huánuco: Cuchero, *Poeppig 1782*, type.

Sapium taburu Ule, Tropenpfl. 9. Beih. 6: 13, 16. *fig. 3 D, E*. 1905, and Bot. Jahrb. 35: 671. *fig. 2 E, G*. 1905; 232.

Apparently scarcely distinguishable from *S. glandulosum*, the only definite contrast in description relating to the seeds, which are described as subtrigonous, compressed, 6–7 mm. in diameter, corrugated.—Croizat thinks it will be shown that this is properly a part

of *S. aereum* and suggests that *Klug 1668* from Putumayo, Colombia, may belong to it. Illustrated, Pax, l.c. p. 207; Hook. Icon. *pl. 2898*.

The milky sap is often mixed with that of *Hevea* (Ule).

San Martín: Moyobamba, *Weberbauer 4759* (det. Pax); 288. Brazil. "Tapuru."

Sapium utile Preuss, Exped. Centr. & Südamer. 386. *pl. 11*. 1901; 204. *S. biglandulosum* (L.) M. Arg. var. *Pavonianum* M. Arg. Linnaea 32: 116. 1863? *S. Pavonianum* (M. Arg.) Huber, Bull. Herb. Boiss. sér. 2, 6: 356. *fig. 14*. 1906?

Becoming a tree 12–15 meters high, the rather stout branches erect, the branchlets densely leafy; petioles 1.5–3.5 cm. long with 2 linear immersed sometimes obsolete glands at apex; stipules ovate; leaves oblong, lanceolate or oblanceolate, cuneate or rarely rounded at base, shortly and obtusely acuminate, subcoriaceous, plane or nearly so, minutely serrulate or subentire, often 1.5–2 dm. long, 5.5–7 cm. wide, the secondary nerves very many and prominent especially beneath; spikes androgynous or all flowers male, terminal, 1–2.5 dm. long; bracts broadly ovate, subentire, with an oblong-peltate gland base each side, the male flowers 7–9, these with bifid calyx; stamens 2; ovary 3-celled; capsules globose, mature undescribed.—The type was from Juan de Oro, Ecuador. The Peruvian specimen may not be the same; the plate of *S. Pavonianum* shows an entire leaf. Illustrated, Hook. Icon. *pl. 2896*.

The sap is said to provide a rubber of medium quality and according to Preuss the fast-growing tree is easily adapted to use as a shade tree for cacao and other plantations.

Peru: Without locality, (Pavón). Ecuador; Colombia. "Palo de Leche."

46. ACTINOSTEMON Klotzsch

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v: 57–80. 1912.

Shrubs or trees, glabrous or nearly, with alternate shortly petioled entire pinnate-nerved leaves often more or less glanduliferous beneath, and ordinarily if not always monoecious apetalous flowers in solitary or few terminal or axillary racemes from (in bud) coriaceous imbricated scales, the male flowers 2–7 in the axils of often biglandular bracts, the solitary female often well-pedicelled. Disk lacking. Male perianth (as female) commonly with 1–3 sepals, 2–17 free

stamens, anthers ovoid, rudimentary ovary wanting; female flowers (as male) sometimes esepalous; ovary 3-celled, styles connate at base, recurved, undivided; capsules with 3 armed or smooth cocci, the subglobose seeds carunculate.

Actinostemon imbricatus M. Arg. Linnaea 34: 216. 1865; 80.

Ultimate branches elongate, compressed above, glabrous as the entire plant; leaves obovate, rounded-obtuse, shortly cuneately narrowed into the short (4–6 mm.) petiole, rigid, prominently reticulate, eglandular beneath, 5–12 cm. long, 3–8 cm. wide; secondary nerves nearly all starting between the base and the lower third of the blade, all ascending, subflexuose; male spikes aggregate, short, strobiliform at first by the many imbricate brown ciliolate scales; flowering bracts minute, 3-flowered, early caducous; stamens 3; receptacle between the bases of the filaments tumid, accrescent; female flowers unknown.—Mueller remarked: recedes from this genus in the nature of the male receptacle and the deciduous bracts. Pax: probably to be excluded. However, neither authority suggested another relationship. F.M. Neg. 32495.

Huánuco: Cuchero, *Poeppig 1308*, type. Brazil?

47. MAPROUNEA Aublet

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v: 175–180. 1912.

Entirely glabrous trees or shrubs with petioled entire leaves often maculate-glandular near the base and subglobose usually bisexual terminal spikes of small usually monoecious apetalous flowers, the 1–3 female usually pedicellate below, the congested sessile male, these often 3 in each imbricate glandular bract. Disk none. Calyces 3- or the male 2-lobed and membranous, urceolate, the segments imbricate. Stamens 1–3, exserted, the slender filaments nearly connate. Ovary 3-celled; styles apically free, undivided; ovules solitary. Capsules globose, lightly tridymous, the cocci bivalved. Seeds obovoid, foveolate or smooth with large fleshy caruncle.

Baillon, Adansonia 5: 332. 1865, referred this to *Stillingia* Garden, a genus only recently found in Peru, characterized by the pericarp persisting radiately between the cocci; later, Hist. Pl. 5: 133. 1874, he placed it in *Excoecaria* L., more reasonably probably from a broadly conservative viewpoint.

Maprounea guianensis Aublet, Pl. Guian. 2: 895. *pl. 342.* 1775; 177.

Small tree sometimes 15 meters high; petioles slender, 5–15 mm. long; stipules ovate, obtuse; leaves ovate or oblong-elliptic, sometimes lanceolate, firm-membranous or more rigid, acute or subacute both ends or obtuse at base where usually maculate-biglandular, lustrous above, the nerves and reticulation slender, commonly 2.5–7 cm. long, 1.5–3.5 cm. wide; spikes peduncled, cylindric-ovoid, 3–6 mm. long, rarely longer, 3 mm. thick; bracts (both sexes) broadly ovate, thin, shortly acute, eglandular; female pedicels 5–6 mm. long; calyces with broadly ovate denticulate subobtuse lobes; capsules 4 mm. long, 5 mm. thick, the coarsely foveolate dark brown seeds 3–3.5 mm. long and thick with the caruncle.—Mueller Argoviensis in Mart. Fl. Bras. 11, pt. 2: 543. 1874 noted three variants. Williams, Field Mus. Bot. 15: 279. 1936, described the wood which he found used "rather extensively for general carpentry," the tree, sometimes 15 meters high, being characteristic in the Tarapoto plain and in the hills around 500 meters. Illustrated, Mart. Fl. Bras. 11, pt. 2. *pl. 81.*

San Martín: Tarapoto, *Ule 6504; Williams 5427; 5899; 5900.* Lomas, *Williams 6380; 6470.* Moyobamba, *Weberbauer 4477;* 290. Zepelacio, *Klug 3744.* To the Guianas, Brazil and Bolivia. "Airana," "arean" (Williams).

48. HURA L.

Reference: Pax & Hoffm. Pflanzenreich IV. 147. v: 271–274. 1912.

Spiny-trunked tall glabrous tree with abundant bistipulate alternate petioled more or less cordate bright green leaves and terminal reddish often cone-shaped spikes of sessile male flowers, each finally irregularly rupturing bract enclosing one flower, the stoutly pedicelled female borne solitary in the upper axils or at the base of the male spike. Calyces and bracts eglandular, the male membranous, cupulate, truncate-denticulate, the female coriaceous, entire, laxly enclosing 5–20-celled ovary, the high-connate fleshy styles radiately spreading at tip. Stamens often many, indefinite, the filaments continuous with the connectives into a fleshy apically dilated column, the adnate distinct extrorse anthers 2–many-verticillate.

Hura crepitans L. Sp. Pl. 1008. 1753; 272.

Branchlets sometimes aculeate; stipules linear-lanceolate, pubescent, 1.5 cm. long; petioles as long as or longer than the basally

rounded-cordate orbicular-ovate leaves, these often 1–2 dm. wide and as long or longer, abruptly short-acuminate, remotely repand dentate or subentire, often pilose on the prominent nerves beneath, dull both sides; peduncles 5–8 cm. long, the cylindric-ovoid spikes finally to 6 cm. long, about 2 cm. thick; anthers usually 2-verticillate; fruiting pedicels about equaling petioles; ovary with style 3–5 cm. long, the stigma reddish-violet; capsules concave both ends, deeply sulcate, 8 cm. broad, half as long at maturity, expelling the wafer-like seeds with considerable force.—Williams, Field Mus. Bot. 15: 277. 1936, gives the anatomy of the wood, which is used in general carpentry, and describes the tree as erect, the columnar trunk to 18 dm. in diameter, to 40 meters high, armed below with stout conical spines, the pale bark with shallow ridges, the latex said to be injurious to eyes and employed locally as a fish poison as observed by Martius. See Pax, l.c., for variously reported uses of the sap and bark in medicine. Said to be cultivated in most tropical regions. Illustrated, Mart. Fl. Bras. 11, pt. 2: *pl. 86;* also Pax, l.c. p. 272.

San Martín: Tarapoto, *Williams 6318.*—Loreto: Lower Itaya, *Williams 111.* Caballo-Cocha, *Williams 2303.* Yurimaguas, *Williams 4243.* West Indies to Bolivia and Central America. "Catahua" (Williams).

HIPPOCRATEACEAE Juss.

Reference: A. C. Smith, Brittonia 3: 341–555. 1940.

Glabrous or lightly puberulent lianas, shrubs or trees, the branches and simple petioled leaves usually opposite, the stipules if present interpetiolar, minute. Flowers small, hermaphrodite, actinomorphic, bracteolate, usually pedicellate, in compound inflorescences that are axillary or on short branches below the leaves or pseudoterminal. Sepals and petals usually 5, the former imbricate, persisting, as often also the latter, these alternate with sepals, suberect to spreading, inserted beneath or without the edge of the disk, this various in development. Stamens ordinarily 3 (2, 4 or 5), inserted within the disk, the filaments often recurved, the anthers basifixed, 2-celled, never introrsely dehiscent, usually laterally contiguous, the clefts confluent at least apically, rarely dorsally connate, the vertical or oblique clefts distinct. Ovary superior, commonly adnate to or within the disk, usually 3-celled, 2–14 ovules in a cell, these rarely massed, the style short or obsolete with 3(–5)

entire or bifid stigmas. Fruit capsular or drupaceous, if the former composed of 3 separate or connate capsules, if the latter indehiscent. Seeds few to many, endosperm lacking, cotyledons large, radicle small, basally winged in capsules.

The position of the stamens distinguishes the family from the similar Celastraceae which has the stamens without the disk or fused with it, and introrse dehiscence. This compilation follows closely or is copied (with much appreciation) from Smith's scholarly revision, except that it is adapted to my feeling that taxonomy may endeavor, especially in floristic work, to serve greater numbers of students, who often have need for only generic indications. The argument of Smith that "it is by no means difficult to distinguish the 12 genera recognized" introduces a new factor in determining criteria for drawing generic lines; in admitting more broadly defined genera to include subgroups as sections many will find the taxonomy simplified, without having the relationships, so ably discerned or redefined by Smith, obscured.

Disk discontinuous, forming staminal pockets; stigmas sessile; fruit a drupe.....1. *Cheiloclinium.*

Disk continuous; style present; fruit drupaceous or capsular.

Anther clefts vertical or oblique but not confluent; fruit a drupe. 2. *Peritassa.*

Anther clefts horizontal or oblique, confluent.

Fruit drupaceous; ovary if angled not deeply.....3. *Salacia.*

Fruit capsular; ovary deeply sulcate-angled.

Capsules attached separately; petals entire or merely erose. 4. *Hippocratea.*

Capsules connate laterally; petals finely serrate.5. *Anthodon.*

1. CHEILOCLINIUM Miers

Kippistia Miers, Trans. Linn. Soc. 28: 416. 1872, not F. Muell. 1858.

Various in habit but usually at least the upper branches scandent, glabrous or essentially and much-branched with axillary thyrsoid, corymbose or cymose inflorescences, dichotomously branched, the flowers often crowded and paired or ternate at the tips. Sepals usually erose or fimbriate, the petals entire, ordinarily thin-carnose. Disk broken into as many saccate depressions as the stamens which they enclose and which protrude slightly, usually 3, sometimes 5,

rarely 4. Anthers broader than long, extrorsely nutant, dehiscing by horizontal confluent clefts. Ovary subglobose, trigonous or sometimes pentagonous, truncate or depressed, the 3–5 stigmas sessile, entire to bilobed; ovules 2–4 per cell. Fruit subglobose, coriaceous, soon 1-celled with 2–6 oblong- or ovate-angled seeds imbedded in a mucilaginous pulp.—Miers, as Smith, stresses the position of the stigmas opposite the stamens and alternate with the ovary cells as sometimes in *Salacia*, sens. lat. and the latter suggests that this is a derivative condition. Besides the following there are a number of species from the Acre and Solimões basins that may occur within Peru, mostly with narrow not lobed stigmas. Genus placed in Celastraceae by Loesener.

Inflorescence thyrsoid; shrub or slender tree; leaves acuminate, venation above obscure.....*C. cognatum.*

Inflorescence dichotomous; usually lianas; leaf venation obvious.

Stamens normally 3; leaves entire or obscurely crenate; leaves acuminate except *C. obtusum.*

Peduncles 1–3 cm. long; stigmas subtruncate.....*C. Klugii.*

Peduncles 4–8 mm. long; stigmas minutely lobed.

Inflorescence branched 3–6 times; stigma lobes obscure. *C. obtusum.*

Inflorescence branched 6–9 times; stigma lobes obvious. *C. hippocrateoides.*

Stamens normally 5; leaves usually crenate-serrate, acuminate; peduncle usually to 13 mm. long.....*C. anomalum.*

Cheiloclinium anomalum Miers, Trans. Linn. Soc. 28: 420. 1872; 548. *Salacia anomala* (Miers) Peyr. in Mart. Fl. Bras. 11, pt. 1: 144. 1878.

Much like *C. hippocrateoides* but the stamens, stigmas and ovary cells 5, the stigmas minutely lobed, the leaves often serrate but subentire in Peru, usually smaller, 7–15 cm. long, 3–5.8 cm. wide, peduncle usually to 13 mm. long; pedicels 0.8–4 mm. long; sepals entire; petals carnose, 1.3–1.8 mm. long, 1–1.5 mm. wide, usually erose and conspicuously swollen within near the base; fruit to 3 cm. long, 2.5 cm. broad, coriaceous, lustrous, the seeds about 15 mm. long, 10 mm. wide.—Illustrated, Miers, l.c. *pl. 31.* F.M. Neg. 19584.

Loreto: Mouth of the Santiago, *Tessmann 4207.* Brazil; British Guiana.

Cheiloclinium cognatum (Miers) A. C. Sm. Brittonia 3: 529. 1940. *Kippistia cognata* Miers, Trans. Linn. Soc. 28: 417. 1872.

Slender, sometimes tree-like and as much as 12 meters high, younger branchlets terete or subterete; petioles rugose, 3–8 mm. long; leaves chartaceous, olive-green, midnerve prominent both sides, the venation usually obscure, subentire or crenate, slightly revolute, oblong, elliptic- or ovate-oblong, 8–20 cm. long, 2.5–8 cm. wide, obtuse or subacute at base, obtusely long-acuminate; thyrse shortly peduncled, to 10 cm. long, the branches swollen in fruit, rachis and branchlets straight; pedicels very short; sepals broad, obtuse, entire or nearly; petals suberect, thick, 1.5–2.6 mm. long, 1.2–2 mm. wide, opaque or obscurely lineate; fruits spherical or oblong-ellipsoid, to 3.5 cm. long, 3 cm. broad, often lenticellate, the seeds ovate, to 15 mm. long.—*C. lineolatum* A. C. Sm. of Amazonian Brazil has angled branchlets, leaf venation conspicuous, petals lineate. F.M. Neg. 19585.

San Martín: Chazuta, *Klug 4084*.—Huánuco: In forest, Río Cayumba at Río Huallaga, *Mexia 8287*.—Junín: Chanchamayo Valley, *Killip & Smith 24005; Schunke A42*.—Loreto: Mouth of Río Santiago, *Tessmann 3955; 4393*. Bolivia and Rio de Janeiro to Panama and Tobago.

Cheiloclinium hippocrateoides (Peyr.) A. C. Sm. Brittonia 3: 546. 1940. *Salacia hippocrateoides* Peyr. in Mart. Fl. Bras. 11, pt. 1: 142. 1878.

Liana with elongate slender slightly nodally swollen branches, rugose petioles 7–16 mm. long and elliptic-oblong leaves, 8.5–20 cm. long, 3.5–11 cm. wide, obtuse to subattenuate at the decurrent base, cuspidate and obtusely acuminate, chartaceous, drying greenish or olivaceous, entire or undulate crenulate, more or less conspicuously venose both sides; inflorescence branched 6–9 times, peduncle obsolete to 8 mm. long, branches slender, bracts papyraceous, flowers subsessile or pedicels to 2 mm. long; sepals membranous, usually ciliolate; petals thin-carnose or submembranous, 0.8–1.5 mm. long and broad, glabrous or puberulent, subentire to fimbriolate; stigmas broadly oblong, deeply lobed; immature fruits ellipsoid, smooth.—Name originally in herbaria by Richard, probably from French Guiana. Illustrated, Smith, l.c. *pl. 12*. F.M. Neg. 35944.

Loreto: Mishuyacu, *Klug 154*. Bolivia and Brazil to the Guianas.

Cheiloclinium Klugii A. C. Sm. Brittonia 3: 543. 1940.

Liana with terete branchlets slightly swollen at the nodes and chartaceous entire or obscurely crenulate leaves, dark green when dried, paler beneath, conspicuously reticulate-veined both sides, elliptic-oblong, 6.5–11.5 cm. long, 3–5 cm. wide, acute at base on the 6–10 mm. long petioles, broadly acuminate and cuspidate; inflorescence 3–7 cm. long, 5–7 times dichotomously branched, the branchlets slender, as the peduncle, this 1–3 cm. long, pedicels very slender, to 3 mm. long; sepals membranous, subentire; petals thin-carnose, 1.3 mm. long, 1.1 mm. wide, minutely erose, obscurely glandular-lineate; stigmas broadly oblong, obscurely emarginate or truncate.

San Martín: In forest near Moyobamba, *Klug 3689*, type.

Cheiloclinium obtusum A. C. Sm. Brittonia 3: 545. 1940.

Tree, the type to 11 meters, with stout probably scandent branches swollen at the nodes, coriaceous leaves, drying brownish, broadly elliptic, abruptly cuneate at base and decurrent on petiole 8–12 mm. long, rounded or obtuse at apex, entire and often revolute, usually plane above, the nerves slightly raised beneath; inflorescence rigid, 3–5 cm. long, branched 5–6 times, peduncle stout, 4–6 mm. long; flowers subsessile; sepals thin-carnose, the inner scarious and erose-fimbriate-margined; petals carnose, 0.8–1 mm. long and broad, subentire or minutely fimbriolate, obscurely puberulent without; stigmas minutely bilobed.—*C. Krukovii* A. C. Sm., 544, Amazonian Brazil, has obtusely acuminate leaves, longer and glabrous petals.

Loreto: Mishuyacu near Iquitos, *Klug 381*, type.

2. PERITASSA Miers

Similar to *Salacia* from which it is scarcely distinguishable especially in fruit but the stamens distinctive, the cells being vertical, the connective more or less developed and the dehiscence by longitudinal or oblique not confluent clefts; from the more typical species of *Salacia* it is also characterized by its free short-tubular disk, erect stamens, and petals. The stigmas are always obscure, which, however, is a character recurring in species-groups in the allied genus.—There is one species known which approaches *Salacia*, *P. retusa* (Miers) A. C. Sm., as the anther cells diverge at base, the connective obscure; nevertheless these similar plants, it seems to me, may be grouped together separately for convenience and, apparently, naturally.

Leaves obviously crenate-serrate.

Anther connective long-extended; branchlets lenticellate. *P. dulcis.*

Anther connective not extended; branchlets tuberculate. *P. Killipii.*

Leaves entire or obscurely crenate.

Leaves narrowly long-acuminate, distinctly bullate.... *P. bullata.*

Leaves acute or broadly and shortly acuminate, ebullate.

Inflorescence glabrous.

Anther connective extended; leaves obscurely nerved, obtuse or rounded at base..... *P. laevigata.*

Anther connective included; leaves rather prominently nervose, acute at base..... *P. peruviana.*

Inflorescence somewhat tomentulose, glabrate in age. *P. huanucana.*

Peritassa bullata A. C. Sm. Brittonia 3: 513. 1940.

Liana with lenticellate branchlets, opposite or subopposite conspicuously bullate leaves and much-branched sessile or subsessile inflorescences not more than 2 cm. long at anthesis; petioles 3–6 mm. long; leaves obscurely crenulate, chartaceous or thin-coriaceous, drying dark brown, narrowly elliptic, acute at base, caudate (acumen 1–2 mm. wide, 10–20 mm. long, obtuse), secondary nerves prominent both sides, 7–14 cm. long, 1.7–3.7 cm. wide; bracts ovate, less than 1 mm. long; flowers apparently solitary at tips of ultimate branchlets, the slender pedicels 1–1.5 mm. long; sepals papyraceous, narrowly scariose and erose-fimbriolate; petals thin-carnose, about 1 mm. long and half as wide, obscurely erose and sometimes a little farinose within; disk undulate-crenulate; anther clefts slightly oblique, the connective not prolonged; fruiting inflorescence swollen especially the pedicels, the few developing fruits glaucous when young, smooth.

Loreto: In forest near Florida, mouth of Río Zubineta, *Klug 2298*, type.

Peritassa dulcis (Benth.) Miers, Trans. Linn. Soc. 28: 403. 1872; 506. *Salacia dulcis* Benth. in Hook. Journ. Bot. Misc. 4: 9. 1852. *S. Colasi* Benoist, Bull. Soc. Bot. France 80: 335. 1933, fide Smith.

Shrub or small tree with slender usually conspicuously lenticellate branchlets (the lenticels soon tuberculate) and opposite or subopposite prominently crenate-serrate leaves, their rugose petioles

5–12 mm. long, their blades narrowly elliptic, acute at base, rather abruptly and shortly acuminate, the acumen obtuse or callose-apiculate, 10–15 cm. long, 3.5–5 (7) cm. wide, chartaceous, drying brownish, the secondary nerves prominent beneath, the veinlets usually obscure; inflorescence compact, 1–3 cm. long, divided to base or with short peduncle, dichotomous, the slender branchlets usually rusty short-hirsute, the usually connate bracts 1.5–2 mm. long, the pedicels scarcely 1 mm. long; flowers in clusters of 3–5, bractlets minute; sepals papyraceous, rounded, narrowly scarious and subentire; petals submembranous, often glandular-lineolate, 2–2.8 mm. long, about 1 mm. wide, the scariose margins erose; disk membranous, crenulate; anther connective acute, produced 0.1–0.2 mm.; fruit depressed-globose to 4 cm. thick, chartaceous, the 6 seeds oval, to 13 mm. long, 1 cm. broad, the mucilaginous pulp said to be sweet, edible.—Type of *S. Colasi* not seen, reported as from Iquitos. Illustrated, Trans. Linn. Soc. 28. *pl. 26.* F.M. Neg. 13353.

Loreto: Near Iquitos, *Tessmann 3703a; Killip & Smith 27202; Klug 904; Williams 3671; 1501.* Río Mazán, *José Schunke 349.* Río Itaya, *Williams 16.* Brazil.

Peritassa huanucana (Loes.) A. C. Sm. Brittonia 3: 521. 1940. *Hippocratea huanucana* Loes. Repert. Nov. Sp. 1: 163. 1905.

Liana with closely (soon obscurely) brown-tomentulose compactly branched inflorescences and glabrous thin-coriaceous entire leaves on stout petioles 6–10 mm. long; leaf blades brownish when dried, elliptic- or ovate-oblong, 9–18 cm. long, 3.5–7.5 cm. wide, rounded to acute at base, cuspidate or short-acuminate, the obtuse acumen 3–10 mm. long, the secondary nerves nearly plane above, spreading, elevated beneath; inflorescence dichotomously branched several times, finally glabrate, the bracts conspicuous, 1–2 mm. long, as often the bractlets, the flowers paired or in ultimate dichotomies; pedicels about 1 mm. long, usually swollen; sepals rounded or obtuse, erose or fimbriolate, scarious-margined; petals suberect, 1.3–1.9 mm. long, 0.7–1 mm. wide, narrowly scariose and entire, sometimes glandular-punctate; disk undulate-crenulate; anther connective not produced; ovules 4 (probably sometimes 2) in each cell.—Like *P. peruviana* but with spreading instead of sharply ascending basal secondary leaf nerves. F.M. Neg. 13339.

San Martín: Near Moyobamba, 800 meters, *Weberbauer 4575,* type.—Huánuco: Near Monzón, 900 meters, *Weberbauer 3483;* 285.—Loreto: Mouth of Río Santiago, *Tessmann 4303.* Pongo de Man-

seriche, *Tessmann 4870*. Mishuyacu near Iquitos, *Klug 1361*. Brazil? Guiana?

Peritassa Killipii A. C. Sm. Brittonia 3: 516. 1940.

With much resemblance to *P. dulcis* but the brownish branchlets conspicuously tuberculate-scabrous, the leaves papyraceous or thin-chartaceous, sometimes drying olivaceous, the inflorescence comparatively few-flowered, only twice branched, scabrous, the petals only 1.3–1.6 mm. long, the anther connective not prolonged beyond the cells.—Differences slight but unless intermediate states are developed they may be significant.

Loreto: In dense forest near Puerto Arturo below Yurimaguas, *Killip & Smith 27777*, type.

Peritassa laevigata (Hoffmsg.) A. C. Sm. Brittonia 3: 508. 1940. *Tonsella laevigata* Hoffmsg. ex Link, Jahrb. Gewächsk. 1, pt. 3: 68. 1820. *Salacia laevigata* (Hoffmsg.) DC. Prodr. 1: 570. 1824. *S. amazonica* Loes. Verh. Bot. Ver. Brandenb. 48: 179. 1907.

Glabrous, at least the branches scandent, the branchlets notably lenticellate; petioles stout, 8–18 mm. long, opposite or nearly so; leaves elliptic-oblong, sometimes black-punctate beneath, obtuse to rounded at base, subobtuse to shortly acuminate, 10–19 cm. long, 4.5–9.5 cm. wide, coriaceous, entire or somewhat crenulate and thickened at margins, the nerves little if at all impressed above, raised beneath; inflorescence 2–8 cm. long, sessile or nearly, much enlarged in fruit, the papyraceous bracts minute, the obscurely bracteolate flowers laxly borne on pedicels 1–2 mm. long; sepals papyraceous, often very unequal, scarious and subentire; petals thin, 2–2.8 mm. long, 1–1.5 mm. wide, usually erose, sometimes faintly glandular-punctate or lineate; disk rather thin, crenulate; anther connective obtuse, produced 0.1–0.2 mm.; fruits subglobose, to 3.5 cm. thick, stiped, coriaceous, with 2–4 seeds about 2 cm. long, 13 mm. wide.—Apparently somewhat variable in shape and texture of leaves; twice illustrated but, according to Smith, not accurately. F.M. Negs. 13346 (*S. amazonica*); 13366; 35945 (synonyms).

Moore reported the pulp surrounding seeds greatly esteemed, probably the case for all species, including those of *Salacia*.

Loreto: Río Mazán, *José Schunke 227*. Brazil; Venezuela. "Gogo" (Krukoff).

Peritassa peruviana (Miers) A. C. Sm. Brittonia 3: 519. 1940. *Sicyomorpha peruviana* Miers, Trans. Linn. Soc. 28: 411. 1872.

More or less scandent, the branchlets lenticellate, the slender petioles 6–8 mm. long; leaves chartaceous, drying brownish, prominently reticulate both sides, entire or obsoletely crenulate, obovate-elliptic, acute to subattenuate at base, obtusely short-cuspidate at apex, 10–15 cm. long, 4–6.5 cm. wide; inflorescence 2–3 cm. long, dichotomously or pseudodichotomously branched, the peduncle 10–13 mm. long, bracts less than 1 mm. long, pedicels of the laxly arranged flowers about 2 mm. long; sepals rounded, fimbriolate at margins as the oblong petals; disk entire; ovary depressed, trigonous. —In spite of the name the type came probably from Guayaquil, Ecuador, this information being with the Madrid specimen. F.M. Neg. 29390.

Peru(?), cf. remark above. Ecuador.

3. SALACIA L.

Tontelea Aublet, Pl. Guian. 1: 31. 1775. *Thermophila* Miers, Trans. Linn. Soc. 28: 398. 1872, fide A. C. Smith.

Lianas or if shrubby or slender trees the upper branches usually more or less scandent, glabrous or nearly, the opposite or subopposite branches and branchlets often somewhat swollen at the nodes and also a little compressed. Leaves sometimes alternate, the usually grooved petioles often rugulose. Inflorescence axillary or on defoliate branchlets, thyrsoid paniculate, cymose, or more or less dichotomously branched, the flowers congested or lax at the ends of the bracted branchlets. Sepals 5 (4–6), usually rounded, often unequal and erose; petals 5 (6), rather similar. Disk various, annular-pulvinate, truncate-conical, flattened, cupulate or short-tubular, free or adnate, entire to crenulate. Stamens 3 (4), erect to reflexed, the anthers dehiscing by apical confluent or rarely merely contiguous clefts. Styles short to rather long, the stigmas 3 (4) obscure or developed, alternate or opposite to the stamens, entire to lobed sometimes so deeply that the stigmas appear to be 6 and the position is thus obscured. Ovules 2 (rarely 6 or 8), the fruits subglobose or ellipsoid, the few to many angled seeds imbedded in a mucilaginous pulp.—The genus *Tontelea* is maintained by Smith chiefly on the basis of its short-tubular disk; in view of the variability in development of the disk everywhere it seems to me more reasonable and convenient to regard it at most as a section as by Triana and Planchon and by Loesener.

Thermophila cordata Miers, Trans. Linn. Soc. 28: 401. 1872, omitted here, based on a single leaf and a detached flowerless panicle

n the British Museum; not seen by Smith, the identity not established; the type labeled by Pavón from Peru could be from Ecuador, as, for example, was the case for *Peritassa peruviana!* The key, largely after Smith here as elsewhere, needs material for comparison as observed by him.

Stigmas obscure; inflorescences dichotomously branched or thyrsoid paniculate, often elongate, rarely compact (*S. spectabilis*); fasciculate in *S. macrantha*, *S. impressifolia* and *S. juruana*.

Style short; disk not higher than thick; petals smooth.

Disk flat, thicker than high, uniform; leaves often acute or narrowly rounded at base; inflorescence fasciculate except *S. opacifolia*.

Inflorescence 2–5 cm. long.

Petioles 2–7 mm. long; flowers 5–6 mm. wide. *S. opacifolia*.

Petioles 7–20 mm. long; flowers 12–30 mm. wide.

Flowers 24–30 mm. wide. *S. macrantha*.

Flowers less than 22 mm. wide.

Lateral nerves obscure; leaves to 8.5 cm. wide. *S. impressifolia*.

Lateral nerves obvious; leaves mostly wider. *S. juruana*.

Inflorescence 2–2.5 dm. long. *S. insignis*.

Disk erect, thicker above; leaves rounded at base. *S. myrsinoides*.

Style long; inflorescence thyrsoid-fasciculate, disk higher than thick, lobed between stamens; petals tuberculate; inflorescence compact, to 2.5 cm. long. *S. spectabilis*.

Stigmas obvious or conspicuous; inflorescence various, but not fasciculate, more than 5 (at most about 8) cm. long; disk cupulate or short-tubular.

Stigmas entire; petals glabrous.

Leaves three to four times as long as broad. *S. attenuata*.

Leaves two to three times as long as broad. *S. fluminensis*.

Stigmas bilobed or emarginate; petals farinose or puberulent, at least within or without, sometimes obscurely.

Stigmas more or less emarginate or bilobed but clearly distinct.

Stigmas barely emarginate, opposite stamens; petals obviously farinose within. *S. emarginata*.

Stigmas lobed, alternate with the stamens, petals puberulent both sides or only within.

Leaves thin, translucent, obtusely acuminate. *S. corymbosa.*

Leaves coriaceous, opaque, obtusely cuspidate. *S. coriacea.*

Stigmas so deeply lobed as to appear like 6; petals glabrous within.

Leaves chartaceous, acuminate; inflorescence not ceriferous. *S. divergens.*

Leaves coriaceous, rounded or obtusely cusped; inflorescence ceriferous. *S. Weberbaueri.*

Salacia attenuata (Miers) Peyr. in Mart. Fl. Bras. 11, pt. 1: 149. 1878; 474. *Tontelea attenuata* Miers, Trans. Linn. Soc. 28: 384. 1872.

Slender, often scandent; petioles 6–14 mm. long; leaves elliptic-oblong, 7–18 cm. long, 2.5–6.5 cm. wide, acute or attenuate at base and decurrent, gradually acuminate (acumen obtuse, 8–15 mm. long), entire, narrowly revolute, usually sparsely black-punctate beneath, thin-coriaceous or chartaceous, brownish or dark green when dried, secondary nerves 7–10, arcuate-ascending, often rather prominent both sides, sometimes subimmersed, the veins usually obscurely reticulate, inflorescence thyrsoid paniculate, much-branched from base, 1.5–3 cm. long, bracts and bractlets less than 1 mm. long; sepals broader than long, scariose and erose or fimbriate, the entire petals to 2.2 mm. long, 1.6 mm. wide or smaller; disk erect-spreading, undulate or crenulate; stamens suberect, anther clefts horizontal, confluent; stigmas deltoid, spreading, subacute, alternate with stamens; ovules 2 per cell; flowers subsessile, the pedicels or branchlets thick in fruit, the fruit at least 1 cm. in diameter, smooth or minutely rugulose.—Illustrated, Miers, l.c. *pl. 23.* F.M. Neg. 13348.

Loreto: Río Mazán, *José Schunke 251.* Balsapuerto, *Klug 2900.* British Guiana; Brazil; Colombia?

Salacia coriacea (A. C. Sm.) Macbr., comb. nov. *Tontelea coriacea* A. C. Sm. Brittonia 3: 480. 1940.

Liana with terete often conspicuously lenticellate branchlets; stout petioles 9–17 mm. long; thick coriaceous leaves, opaque and brownish when dried, elliptic-oblong, obtuse to acute at base, obtusely cuspidate at tip, 7–30 cm. long, 4–10.5 cm. wide, sometimes black punctate beneath, the 6–12 spreading secondary nerves elevated beneath, the veins immersed or faint; inflorescence 1–3.5 cm. long,

minutely ceriferous-farinose; flowers subsessile, congested, to 3 mm. wide; sepals 0.5–1 mm. wide and long, entire or obscurely fimbriolate, puberulent without, the petals so on both sides, to 2.2 mm. long; disk erect, undulate at margin; stamens suberect, anther clefts horizontal, confluent; stigmas spreading, deeply emarginate or bilobed, alternate with stamens; ovules 2 per cell, fruiting branchlets swollen, the young fruits obscurely rugose.

Loreto: Mishuyacu, *Klug 234*. To the Guianas.

Salacia corymbosa Huber, Bol. Mus. Goeldi 4: 580. 1906; 485. *Tontelea corymbosa* (Huber) A. C. Sm. Brittonia 3: 485. 1940.

Scandent or erect or probably with scandent branches; petioles 5–9 mm. long; leaves oblong or narrowly elliptic-oblong, 8–15 cm. long, 3–6.5 cm. wide, acute or cuneate at base, decurrent, caudate or long-cuspidate at tip (slender acumen obtuse, 7–15 mm. long), papyraceous, translucent, olivaceous when dried, sometimes sparsely black punctate on either side, secondary nerves 6–9, typically strongly curved, arcuate-ascending, acutely elevated both sides, veins prominently reticulate; inflorescence 3–4.5 cm. long, thyrsoid paniculate, divided from base; flowers solitary, 3–4 mm. wide, sepals obtuse, entire or erose as the thin petals, these to 2.4 mm. long; disk suberect, subentire; style stout, stigmas alternate with stamens obviously bilobed but the lobes clearly united in pairs; ovules 2 per cell. Illustrated, Smith, l.c. page 466 (flower). F.M. Neg. 1433.

San Martín: Pongo de Cainarachi, *Klug 2707*.—Loreto: Cerro de Canchahuaya, Río Ucayali, *Huber 1433*, type. Mouth of Río Santiago, *Tessmann 4720* (leaves broader, secondaries spreading).

Salacia divergens (A. C. Sm.) Macbr., comb. nov. *Tontelea divergens* A. C. Sm. Brittonia 3: 491. 1940.

Liana with dark brown lenticellate branchlets and scarcely different from *S. Weberbaueri* but petioles 6–8 mm. long, leaves chartaceous, elliptic-oblong, 8–15 cm. long, 3–5.3 cm. wide, obtuse at base, short-acuminate or conspicuously cuspidate (acumen stout, 6–10 mm. long, obtuse) and the inflorescence not ceriferous; flowers about 3 mm. wide; pedicels 1.5–2 mm. long; disk prominently undulate.

San Martín: Chazuta, 260 meters, *Klug 4120*, type.

Salacia emarginata (A. C. Sm.) Macbr., comb. nov. *Tontelea emarginata* A. C. Sm. Brittonia 3: 494. 1940.

Liana; petioles stout, 15–25 mm. long; leaves broadly elliptic or elliptic-oblong, 10–18 cm. long, 4.5–10.5 cm. wide, obtuse or cuneate at base, obtusely callose-mucronate or short-cuspidate (acumen 3–5 mm. long, callosed), thin-coriaceous, sparsely black-punctate beneath, secondary nerves 7–9, interspersed with others of equal prominence, spreading, elevated both sides, veins laxly reticulate, prominent or immersed; inflorescence 3–8 cm. long, often lax, farinose-ceriferous; flowers 4–5 mm. wide, pedicels 3–6 mm. long, ceriferous as often the calyces; sepals entire, rounded; petals yellow, to 2.3 mm. long, rounded, erose, conspicuously farinose within; disk suberect or slightly spreading, obscurely crenulate; stigmas minutely emarginate, opposite the stamens; ovules 2 per cell.

San Martín: Zepelacio near Moyobamba, 1,100 meters, *Klug 3269*, type.

Salacia fluminensis Peyr. in Mart. Fl. Bras. 11, pt. 1: 149. 1878; 477. *Tontelea fluminensis* (Peyr.) A. C. Sm. Brittonia 3: 477. 1940.

Allied to *S. attenuata;* petioles 7–25 mm. long; leaves olivaceous, dried, 11–22 cm. long, 4.5–9 cm. wide, obtuse to acute at base, cuspidate or shortly acuminate, secondary nerves 7–13, veins rather prominent beneath, sometimes obscure above; inflorescence 3.5–4.5 cm. long; ovules 4 per cell.—**S. ovalifolia** (Miers) Macbr., comb. nov. —*Cuerva ovalifolia* Miers, Trans. Linn. Soc. 28: 371. 1872; *T. ovalifolia* (Miers) A. C. Sm. l.c., 476—of Colombia and adjacent Brazil has leaves rounded or obtuse at apex, the veins immersed, the inflorescence short to 8.5 cm. long. F.M. Neg. 13354.

Loreto: Río Mazán; *Schunke 232*. Bolivia; Brazil.

Salacia impressifolia (Miers) A. C. Sm. Bull. Torrey Club 66: 247. 1939; 447. *S. grandiflora* (Benth.) Peyr. in Mart. Fl. Bras. 11, pt. 1: 157. 1878, not Kurz, 1872. *Raddia impressifolia* Miers, Trans. Linn. Soc. 28: 392. 1872. *Anthodon grandiflorus* Benth. in Hook. Journ. Bot. Misc. 4: 10. 1852.

Liana or scandent shrub related to *S. macrantha,* but the leaves rarely decurrent, usually rounded or obtuse at base, usually gradually acuminate, 8–21 cm. long, 3.5–8.5 cm. wide, the nerves if elevated beneath not prominent; sepals to 2.6 mm. long, 2.6–4 mm. wide, sometimes ciliate, often punctate or variegated as the petals, these 5.5–10 mm. long, 5–8 mm. wide; disk nearly of the other species; anther clefts oblique; ovules 4 per cell.—Illustrated, Vellosia 3,

pt. 1. *pl. 8* (as *S. polyanthomaniaca*). F.M. Negs. 19587; 23265 (*S. grandiflora*).

Junín: Cahuapanas, Río Pichis, *Killip & Smith 26720*.—Loreto: Río Itaya, *Tessmann 5202*.—Río Acre: *Ule 9555*. Amazonian Brazil; Bolivia.

Salacia insignis A. C. Sm. Brittonia 3: 435. 1940.

Character in general that of *S. opacifolia*, but the petioles stout, 2–4 mm. thick, 10–16 mm. long, leaves pale green when dried, elliptic-oblong, 25–28 cm. long, 9.5–10 cm. wide, with 14–18 secondary nerves and elongate inflorescences from the branchlets below or between the leaves, the panicles 2–2.5 dm. long on peduncles 3–5 cm. long with many flowers 6–8 mm. wide at anthesis; disk thinner toward outer margin, not at all elevated.—A liana, the branchlets with loose brown bark.

Loreto: In forest at Mishuyacu near Iquitos, *Klug 74*, type.

Salacia juruana Loes. Verh. Bot. Ver. Brandenb. 48: 181. 1907; 449.

Resembles the allied *S. impressifolia* and *S. macrantha*, especially the former, from which it differs in having the 10–13 secondary nerves very prominent beneath, the leaves 12–27 cm. long, 5–15 cm. wide, rounded or obtuse at both ends; flowers 13–14 mm. wide, the sepals 1–1.5 mm. long, 2–3 mm. wide, entire or a little ciliolate, the petals 5–7 mm. long, 4–5 mm. wide, sometimes sparsely glandular; anther clefts oblique; ovules 6–8 per cell.—Pedicels are 8–15 mm. long, in the similar *S. gigantea* Loes., 3–3.5 mm. long, flowers 15–18 mm. wide, style obsolete, ovules 2 per cell. As Smith remarks, the species in this group are apparently closely related. F.M. Neg. 13358.

Loreto: Yurimaguas, *Killip & Smith 29072*. Mouth of Río Santiago, *Tessmann 4672*.—Río Acre: Mouth of Río Macauhán, *Krukoff 5731*. Adjacent Brazil.

Salacia macrantha A. C. Sm. Bull. Torrey Club 66: 245. 1939; 445.

Slender tree marked by the large (24–30 mm. wide) flowers borne in few-flowered fascicles or glomerules in the axils or on defoliate branchlets; petioles stout, 7–20 mm. long; leaves elliptic, oblong or obovate-oblong, usually attenuate and decurrent at base, shortly and obtusely acuminate, 15–32 cm. long, 4.5–11.5 cm. wide, cori-

aceous, olivaceous or greenish dried, often glaucous beneath, the secondary nerves 7–11, often arcuate, more or less prominent beneath; veins obscurely reticulate; sepals 3–4 mm. long and broad, entire, narrowly scariose; petals 5 (6), thin, yellow or greenish, 10–13 mm. long, 7–10 mm. wide; disk elevated at inner margin, conspicuously flattened and membranous at the outer and concealing the petal-bases; anthers dehiscing by horizontal apical confluent clefts; ovules apparently 6 per cell; fruiting pedicels much swollen, the subglobose fruit 3–4 cm. thick, very rugose and lenticellate.

San Martín: Chazuta, *Klug 4047*.—Loreto: Mishuyacu, *Killip & Smith 29893; Klug 184*. Adjacent Colombia and Brazil.

Salacia myrsinoides (A. C. Sm.) Macbr., comb. nov. *Tontelea myrsinoides* A. C. Sm. Brittonia 3: 499. 1940.

Liana with terete striate branches; petioles 6–8 mm. long; leaves elliptic- or ovate-oblong, rounded or broadly obtuse at base, cuspidate (acumen about 1 cm. long, obtuse), 9–14 cm. long, 4–5.5 cm. wide, chartaceous, brownish when dried, secondary nerves 6–8, arcuate ascending, obvious only beneath, the veins obscure; inflorescence on defoliate branchlets, 6–8 cm. long, thyrsoid-paniculate, densely brown puberulent, bracts and bractlets soon caducous; pedicels about 1 mm. long; flowers 2–2.5 mm. wide, sepals and petals membranous, entire, the latter yellowish, oblong-elliptic, about 1 mm. long; disk erect, entire, slightly thicker at tip than at base; anthers dehiscing by confluent horizontal apical clefts; style short, conical, truncate; ovules 2 per cell.—Similar but leaves oblong or obovate-oblong, abruptly short acuminate, inflorescence dichotomous and glabrous is **S. glabra** (A. C. Sm.) Macbr., comb. nov. (*T. glabra* A. C. Sm. l.c. 500), of adjacent Bolivia; ovary terete, petals spreading but disk thicker at apex than at base and in this latter character suggesting some *Hippocratea* species; probably variations of this sort have occurred independently in each of these genera, so that the character cannot be taken phylogenetically as significant. It seems to me that Smith has overemphasized the importance of disk development, which pretty obviously nearly exhausts the imagination in conceivable forms.

Loreto: Mishuyacu near Iquitos, *Klug 712*, type.

Salacia opacifolia (Macbr.) A. C. Sm. Brittonia 3: 434. 1940. *Hippocratea opacifolia* Macbr. Field Mus. Bot. 8: 123. 1930. *S. gracilis* A. C. Sm. Bull. Torrey Club 66: 249. 1939, fide Smith.

Branchlets cinereous, often prominently lenticellate; petioles 2–7 mm. long; leaves obovate-elliptic or narrowly elliptic, attenuate to narrowly rounded at base, abruptly acuminate (acumen usually rounded, 5–15 mm. long), entire or slightly undulate, 10–17 cm. long, 3.5–7.5 cm. wide, chartaceous or thin-coriaceous, brown or above olivaceous when dried, secondary nerves 6–10, rather conspicuous both sides as the reticulate veins; inflorescence axillary, 2–5 cm. long, 3–5-times dichotomous, often from base, the papyraceous bracts 1–1.5 mm. long; flowers sometimes paired, 5–6 mm. wide on pedicels 8–12 mm. long; sepals sometimes punctate, erose, the obovate petals faintly if at all so, 1.9–2.6 mm. long, often punctate; disk flattened, uniformly thickened; anther dehiscence by horizontal apical confluent clefts; style minute; ovules 2.—Slender tree; attains 7 meters.

Junín: Chanchamayo Valley, 1,500 meters, *Schunke 305*, type. Yapas on Pichis Trail, *Killip & Smith 25498*. Cahuapanas on Río Pichis, *Killip & Smith 26733*.—Loreto: Yurimaguas, *Killip & Smith 28024*. Brazil.

Salacia spectabilis A. C. Sm. Brittonia 3: 436. 1940.

Slender tree with stout closely lenticellate branches; petioles 4–5 mm. thick, strongly rugose, flattened above, 2.5 cm. long or longer; leaves elliptic-oblong, obtuse or acute at base (apex unknown), 25–37 cm. long, 10–14 cm. wide, drying olivaceous, chartaceous, secondary nerves 11–13, ascending, straight, the veins horizontally reticulate; inflorescence on defoliate branchlets, 1.5–2.5 cm. long, compactly paniculate, the peduncle short, the clustered flowers 3–3.5 mm. wide; pedicels about 1 cm. long; sepals membranous, cuspidate or subacute, subentire or erose as the pink orange-tinted elliptic-oblong petals, these irregularly tuberculate within; disk conic-pulvinate at margins, produced into 3 deltoid teeth alternate with stamens, these reflexed and with anthers dehiscing by horizontal apical confluent clefts; ovary connate, the style filiform-subulate, truncate or capitate, ovules 2 in each cell.—*S. acreana* A. C. Sm., with similar disk-teeth, has thicker petioles, still larger leaves, the veins immersed and inflorescence 7–12 cm. long.

Loreto: In dense forest near San Antonio, Río Itaya, *Killip & Smith 29416*, type.

Salacia Weberbaueri (A. C. Sm.) Macbr., comb. nov. *Tontelea Weberbaueri* A. C. Sm. Brittonia 3: 489. 1940.

Liana, with stout conspicuously lenticellate branches; petioles 11–13 mm. long; leaves obovate-elliptic, cuneate at base, rounded or obtusely cuspidate at apex, 8–14 cm. long, 4.5–7.5 cm. wide, coriaceous, olivaceous above and brown beneath (dried), secondary nerves 8–11, spreading, prominent both sides, veins obscurely reticulate; inflorescence 1–2.5 cm. long, peduncle stout; branchlets densely farinose-ceriferous; flowers subsessile, crowded, 3.5 mm. wide, sepals rounded, erose or fimbriolate, petals submembranous, about 2 mm. long, erose, sometimes puberulent; disk erect-spreading; stigmas deeply bilobed, the segments of the stigmatic surface essentially equal; ovules 2 per cell; fruiting inflorescence much swollen, the oblong-ellipsoid fruits to 3.5 cm. long, 1.5 cm. thick, blackish and rugose in herb. Stigmas apparently opposite the stamens.—*T. cuspidata* A. C. Sm., l.c. p. 490, of Bolivia has thinner proportionately narrower leaves, conspicuously cuspidate at tip. Illustrated, Smith, l.c. p. 466 (flower).

Libertad: Above Ongón, valley of the Mixiollo, 1,700 meters, *Weberbauer 7068*, type.

4. HIPPOCRATEA L.

Pristimera Miers, Trans. Linn. Soc. 28: 360. 1872. *Cuervea* [Tr. & Pl.] Miers, l.c. 370.

Lianas or at least the branches finally scandent. Inflorescence paniculate-corymbose, axillary, congested at branchlet tips or on short leafless branchlets, the flowers apically crowded, lateral or lax, always pedicellate and with 5 imbricate rounded sepals, 5 spreading petals, 3 erect to reflexed stamens, the anthers dehiscing by confluent horizontal clefts. Ovary acutely trigonous or early obviously 3-lobed, style slender to rather stout, stigmas obscure to rather prominent, alternate or opposite the stamens, the 3 cells each with 4–6 (2–8) ovules. Fruiting inflorescence more or less swollen, developing 1–several capsular fruits consisting of 3 separately attached dehiscing flat or convex flabellate pods with 2–8 oblongish seeds that are strikingly winged at base.—The disk varies as in the drupaceous fruited groups in development as to form, size and indument (to absence) and is regarded by Smith as of taxonomic importance.

Petals barbate, 2.5–4 mm. long; disk cylindric or truncate-conical. *H. volubilis.*

Petals not barbate; disk various.

Stigmas opposite stamens; disk cylindric, prominent; petals 5–9 mm. long..... *H. Kappleriana.*

Stigmas alternate with stamens; disk minute, annulate; petals 1.2–2.2 mm. long.

Inflorescence nodes by contraction at base, pseudoarticulate; disk 5-sided..... *H. nervosa.*

Inflorescence nodes not contracted; disk about circular.

Leaves obtuse or obtusely apiculate; ovules 6–8 per cell. *H. andina.*

Leaves long-acuminate; ovules 4 per cell..... *H. tenuiflora.*

Hippocratea andina (Miers) Macbr., comb. nov. *Pristimera andina* Miers, Trans. Linn. Soc. 28: 364. 1872; 376.

Liana, with often densely lenticellate branchlets; petioles 8–15 mm. long; leaves narrowly to broadly elliptic or ovate-elliptic, obtuse to narrowed at base, obtuse or obtusely cuspidate at tip, 4–16 cm. long, 1.5–7 cm. wide, undulate to obviously crenate, with 7–10 secondary nerves prominent beneath; inflorescence to 11 cm. long, often much smaller, the bracts less than 1 mm. long; flowers 2.5–4 mm. wide, pedicels to 1.5 mm. long, sepals scariose, subentire or erose, petals 1.3–2.2 mm. long, entire or nearly, sometimes glandular or pulverulent; disk annular; filaments gradually wider at base; style fleshy; ovules 6–8 per cell; capsules elliptic or obovate-elliptic, to 5 cm. long, half as wide, the seeds with wings to 3 cm. long, half as wide.—Type locality San Luiz, "Peru, alt. 7,000 ft.," but locality perhaps Bolivian. There are two earlier names very inadequately published and I believe they should be ignored, since no specimens are cited (Smith). Illustrated, Schnizl. Icon. *pl. 237, figs. 10–15.* F.M. Negs. 13336; 13338 (synonyms).

Peru (?; see remark above). Southern Brazil and Bolivia to Argentina.

Hippocratea Kappleriana Miq. Linnaea 26: 220. 1853; 399. *Cuervea Kappleriana* (Miq.) A. C. Sm. Brittonia 3: 399. 1940.

Liana, the branchlets often rugose; petioles 8–13 mm. long; leaves elliptic-oblong or ovate-oblong, more or less narrowed to rounded at base, gradually acuminate (acumen 5–10 mm. long), entire or obscurely crenulate, 8–19 cm. long, 4–10 cm. wide, the 6–9 secondary nerves as the fine reticulation prominent beneath; inflorescence 5–12 cm. long, branching from near base; flowers white, fragrant, 10–17

mm. wide, pedicels 1.5–3 mm. long, sepals subentire, petals obovate-elliptic, 5.5–9 mm. long, entire or a little crenulate; disk membranous, short-cylindric; filaments much widened at base; style stout, the stigmas usually conspicuous but not always; ovules 4–6 per cell; capsules broadly obovate or suborbicular, 5–9 cm. long, 5.5–10 cm. wide, abruptly stiped, 1–1.5 cm. thick, the seed wings about 2 cm. long, 5 mm. wide.

Loreto: Río Napo near Mazán, *Mexia 6446a.* To Central America and the Guianas; West Indies.

Hippocratea nervosa (Miers) Macbr., comb. nov. *Sicyomorpha nervosa* Miers, Trans. Linn. Soc. 28: 412. 1872. *H. Ulei* Loes. Verh. Bot. Ver. Brandenb. 48: 177. 1907. *Pristimera nervosa* (Miers) A. C. Sm. Brittonia 3: 370. 1940.

Branchlets elongate, sometimes a little quadrate; petioles 8–15 mm. long; leaves elliptic or broadly ovate-elliptic, 7–20 cm. long, 3–9 cm. wide, obtuse or acute at base, obtusely acuminate, undulate or crenate, thin, the 7–9 secondary nerves prominent beneath; inflorescence 5–8 times branched, to 7 cm. long, often much smaller, the bracts and bractlets conspicuous; flowers 1.7–3.5 mm. wide, pedicels less than 1 mm. long, sepals erose or ciliate, petals more or less erect, 1.2–1.8 mm. long, entire; disk pentagonous, annular; filaments broadened at base; style fleshy, ovules 4–8 per cell.—F.M. Neg. 13344 (*H. Ulei*).

San Martín: Near Tarapoto, *Spruce 4486; Ule 6354* (type, *H. Ulei*).—Loreto: Yurimaguas, *Killip & Smith 28897.*—Cuzco: Cosñipata, 700 meters, *Weberbauer 6948.* To Panama, Guiana and Bolivia.

Hippocratea tenuiflora Mart. ex Peyr. in Mart. Fl. Bras. 11, pt. 1: 132. 1878; 382. *Pristimera tenuiflora* (Mart.) A. C. Sm. Brittonia 3: 382. 1940.

Branchlets subterete or slightly angled; petioles 3–8 mm. long; leaves narrowly elliptic, acute or obtuse at base, long-acuminate, the slender obtuse acumen 1–2 cm. long, obsoletely crenulate or undulate, secondary nerves 6–8, prominent beneath; inflorescence 1–2.5 cm. long, 3–5 times branched; bracts about 1 mm. long; flowers 2–2.7 mm. wide, subsessile, sepals minutely erose, petals also or subentire or glandular-punctate, 1.5–2 mm. long; disk slightly elevated; filaments only little wider at base; ovules 4 per cell (5 according to Peyritsch). Illustrated, Mart. l.c. *pl. 42.*

Loreto: La Victoria, *Williams 2638*. Caballo-Cocha, *Williams 2412*. Brazil and adjacent Colombia.

Hippocratea volubilis L. Sp. Pl. 1191. 1753; 359. *H. ovata* Lam. Encycl. 1: 100. 1791. *H. viridis* R. & P. Fl. Peruv. 1: 44. 1798. *H. copiosiflora* Miers, Trans. Linn. Soc. 28: 341. 1872. *H. perspicua* Miers, l.c. 342.

Liana, the younger parts including the 2–6 times well-peduncled inflorescences densely brown puberulent; petioles slender, sometimes margined, 4–18 mm. long; leaves ovate or elliptic or oblong-elliptic, usually 6–14 cm. long, 3–7 cm. wide, rounded to attenuate at base, often decurrent, rounded to short acuminate at apex, the acumen sometimes 12 mm. long but obtuse; margins obviously crenate or serrate, the teeth often callose-apiculate, or again merely undulate or subentire; secondary nerves 5–10, prominent, especially beneath; flowers 4–8 mm. wide, pedicels 1–3 mm. long; sepals erose or ciliolate; petals thin, 2.5–4 mm. long, ciliolate and often puberulent both sides as well as transversely barbellate within near tip, this subacute; disk sometimes expanded at base as the ligulate filaments; capsules obovate- or oblong-elliptic, 4–8 cm. long, 1.5–4 (5) cm. wide, slightly swollen at base, rounded or emarginate at tip; seeds sometimes apiculate, the obovate wing finally 2–4 cm. long, 10–25 mm. wide with prominent funicle to 4 mm. long. Illustrated, Smith, l.c. p. 358. F.M. Negs. 35934 (*H. copiosiflora*); 29389 (*H. viridis*).

San Martín: Juan Guerra, *Williams 6923*. Tarapoto, *Spruce* (type, *H. copiosiflora*); *Williams 6651*. Zepelacio near Moyobamba, *Klug 3676*.—Amazonas: Vitoc, *Ruiz & Pavón*. Chachapoyas, *Mathews 3033* (type, *H. perspicua*).—Huánuco: Pozuzo, *Ruiz & Pavón* (type, *H. viridis*).—Loreto: *Tessmann 4421*. Río Nanay, *Williams 980; 1206; 1218; 1219*. Caballo-Cocha, *Williams 2440*. To Mexico, Florida and Argentina. "Yaco yaje" (Williams).

5. ANTHODON R. & P.

Lianas vegetatively similar to Hippocrateas but the petals conspicuously and irregularly serrulate, the anthers broadly reniform, the ovules 8–14 per cell and imbricate in a mass instead of biseriate and the flattened capsules firmly connate by the emarginate or scalloped wings.

Anthodon decussatum R. & P. Fl. Peruv. 1: 45. *pl. 74*. 1798; 420. *Hippocratea Anthodon* Pers. Syn. Pl. 1: 41. 1805. *Tonsella*

decussata (R. & P.) Vahl, Enum. 2: 30. 1805. *Tontelea decussata* (R. & P.) Poir. in Lam. Encycl. Suppl. 5: 316. 1817. *Salacia decussata* (R. & P.) G. Don, Gen. Syst. 1: 627. 1831. *H. decussata* (R. & P.) Peyr. in Mart. Fl. Bras. 11, pt. 1: 138. 1878.

Branchlets terete; petioles 5–12 mm. long; leaves elliptic or ovate-elliptic, 4–11 cm. long, 1.5–5 cm. wide, obtuse or acute at base, gradually acuminate (acumen to 1 cm. long), membranous, lustrous, crenulate or serrulate, secondary nerves 7–9, prominent as reticulate veins both sides; inflorescence 1.5–5 cm. long, a many-flowered rather open cluster to 6 cm. broad, the slender peduncle 5–15 mm. long, bracts 1–2 mm. long; flowers 5–8 mm. wide, pedicels slender, 2–5 mm. long, sepals ciliate or erose, petals 3–4 mm. long, to half as wide, minutely serrulate (serrations 7–11 per mm.); disk short-cylindric; filaments broader, base and apex; style stout, stigmas minute, opposite stamens, sometimes a little plicate and appearing alternate; capsule connate into a fruit to 14 cm. across with 8–14 seeds in each capsule, the wings to 3.5 cm. long, 1.5–2 cm. wide.—Illustrated, Smith, l.c. p. 419 (fruit); Mart. Fl. Bras. 11, pt. 1. *pl. 44;* HBK. Nov. Gen. & Sp. 5: *pl. 443* (floral details inaccurate, Smith). F.M. Neg. 13335.

San Martín: Near Tarapoto, *Ule 6620* (type, *H. decussata*, var. *parviflora*).—Huánuco: Near Pozuzo, *Ruiz & Pavón*, type. Bolivia to Venezuela and Colombia.

BUXACEAE. Boxwood Family

Usually ligneous plants, with evergreen coriaceous simple estipulate leaves, either alternate or opposite, the small monoecious or dioecious apetalous flowers in bracteate spikes or dense racemes. Sepals if present imbricate and usually 4 with as many stamens opposite them or these 6 with 2 pairs opposite the inner sepals. Anther cells bivalved or opening longitudinally. Female flowers often larger than male and fewer or solitary. Ovary superior, 3-celled with entire approximate or widely separated styles, the 1 or 2 ovules pendulous. Fruit capsular or drupaceous with black lustrous seeds, the endosperm fleshy, embryo straight with flat or thick cotyledons.

STYLOCERAS A. Juss.

Glabrous trees, with alternate entire coriaceous leaves, the veins very prominent beneath, and sessile short dense male spikes in the axils, the female flowers often solitary and pedicellate or sometimes

at the base of the male spike. Disk none. Calyx lacking in male flowers, stamens 6–30, filaments very short, anthers oblong, erect, receptacle adnate to bracts, rudimentary ovary none. Female flowers with 5 sepals similar to the several bracts, ovary 2(–4)-celled, styles 2, long, entire, ovules solitary. Drupe fleshy but drying hard, the styles persisting.

Styloceras laurifolia (Willd.) HBK. Nov. Gen. & Sp. 7: 173. 1825. *Trophis laurifolia* Willd. Sp. Pl. 4: 733. 1806. *S. Kunthianum* A. Juss. Euphorb. Tent. 117. *pl. 17, fig. 56?* 1824.

Branchlets angled; petioles 1.0–2.5 cm. long; leaves oblongish, obtuse or barely acute, 1–2 dm. long, usually 4–4.5 (6.5) cm. wide, lustrous above, paler beneath; spikes about 2.5 cm. long, flowers sessile, unibracteate, the ovate acute bracts ciliate; anthers often about 12, sessile, stout, tetragonous, lightly curved; female flowers axillary, solitary, peduncled, 8 mm. long, with many small bracts and cupulate 4-lobed calyx; ovary usually 2-celled, the long styles spreading-recurving.—Ovary of *S. Kunthianum* 4-celled, capsule globose, 2–3-horned, pleasantly scented. Illustrated, HBK. l.c. *pl. 638.*

Yields, according to Weberbauer, a good wood.

Libertad: Usquil, *Weberbauer 7000; 6999.*—Huánuco: Río Pozuzo, *Weberbauer 6788; 6733a.*—Junín: Huancayo, Pariahuano, 3,100 meters, *Weberbauer 6995.* Utcuyacu, *Woitkowski 497* (det. Morton). To Colombia. "Sapanque," "limoncita de Cachos," "curape."

ICACINACEAE

Reference: Richard A. Howard, Journ. Arnold Arb. 21: 461–489. 1940; 23: 55–78, 479–494. 1942; Contr. Gray Herb. 142: 1–92. 1942.

Ligneous plants, often trees, with exstipulate mostly alternate leaves and bisexual or functionally unisexual 4–5-merous bracted flowers, axillary or terminal, extra-axillary or supra-axillary but always with small inferior imbricately lobed calyx (usually articulated below) and valvate free or united, rarely absent, petals (usually 5, rarely 4–6), the stamens alternate with them, the fleshy or filiform filaments, if present, commonly pubescent, the anthers with 4, rarely 2 cells, often deeply lobed. Disk often lacking, sometimes fleshy. Ovary 1(3–5)-celled; ovules usually 2, pendulous from near tip of ovary, collateral or rarely superposed. Style usually short,

stigma large or punctiform. Fruit drupaceous, 1(–3)-celled, 1(–3)-seeded, symmetrical or flattened, the funicle in a special tubular canal of the putamen or free in the sarcocarp; embryo minute, small or large, the endosperm copious.

It is fortunate for the usefulness of this compilation that the work of Dr. Howard appeared before its publication; his thoughtful studies, which have resulted in obvious clarification of the taxonomy, have been followed, it is hoped accurately, and my indebtedness is acknowledged with pleasure.

Flowers unisexual or rarely a few perfect; fruits crested or appendaged.

Flowers 4-parted, the male spicate without rudimentary ovary, the cymose female pubescent; fruit glabrous within, reticulate crested without.....1. *Calatola.*

Flowers 5-parted, cymose; ovary glabrous, rudiment present in male flowers, fleshy pulvinus in female persisting as an appendage on fruit.....2. *Discophora.*

Flowers perfect; fruits (known) neither crested nor appendaged.

Ovary as drupe 2–3-celled; axillary inflorescences fascicled-paniculate; petals reddish pubescent within (Peru)...3. *Emmotum.*

Ovary 1-celled (rarely 2-celled, *Citronella*); petal pubescence, if present, white or pale.

Petals glabrous within; fruit (known) partly divided, small, the seed hippocrepiform.

Lianas; flowers not articulated, inflorescence axes often flattened.....4. *Pleurisanthes.*

Erect or only branches clambering; flowers articulated, axes terete.....5. *Citronella.*

Petals pubescent within; fruit without partial partition, 3.5–7 cm. long (known).

Ovary, as cell within, glabrous; trees.....6. *Poraqueiba.*

Ovary, as cell within, pubescent; shrubs or lianas.

Inflorescence axillary; connective linear.....7. *Leretia.*

Inflorescence terminal; connective broadly triangular.
8. *Humirianthera.*

1. CALATOLA Standley

Reference: Richard A. Howard, Contr. Gray Herb. 142: 13–20. 1942.

Trees with revolute margined leaves (blackening in herbarium) and axillary minute dioecious 4-merous flowers, the male valvate and in dense pseudo-spikes, gamopetalous, the lobes with obvious midrib villous within, the female solitary or in racemes, the petals inconspicuous. Anthers oblong, basifixed, longitudinally dehiscent. Ovary cylindric, pubescent, the style obsolete. Drupes typically bicrestate and usually reticulate dentate-crested; seed solitary, the embryo minute.

Wood white and desirable because immune to insect-attack; the fruits of some species are said to be edible at least when roasted and contain, as the bark and leaves, a pigment used as a blue dye.

Calatola venezuelana Pittier, Bol. Soc. Venez. Cienc. Nat. 4: 360. 1938; 18.

Branches terete, minutely appressed puberulent; petioles 1.5 cm. long, almost winged; leaves broadly oval to oblong, acute at the usually oblique base, abruptly acuminate to rounded at tip, 17–20 cm. long, 8–12 cm. wide, glabrous above, sparsely villous beneath becoming glabrate except on the 10–12 pairs of veins; flowers not known; drupes ovoid to subglobose, 4.5–6.5 cm. long, 3.5–4.5 cm. in diameter, the putamen bivalved, sutures prominent, valves rugose, the crests conspicuous and more or less dentate-reticulate.—Known to 17 meters tall with a trunk diameter of 4 dm. According to Pittier the fruits finally dehiscent, recorded for no other species. Nearly *C. costaricensis* Standley but there appear to be reliable differences in the ornamentation of the putamen (Howard). Other species to be expected include the Ecuadorean *C. pastazana* Sleumer and *C. colombiana* Sleumer, both fewer leaf veins and fruits constricted or conical at base, those of the former subglobose, 4 cm. long, of the latter, ellipsoid-oblong, 5 cm. long. Illustrated, Notizbl. Bot. Gart. Berlin 15: 249. *fig. 4a* and *b*.

Fruits of this species are inedible unless roasted.

Huánuco: Shapajilla, *Woytkowski 19*. Colombia; Venezuela. "Orosul," "venenito."

2. DISCOPHORA Miers

Reference: Richard A. Howard, Contr. Gray Herb. 142: 21–30. 1942. *Kummeria* Mart. ex Engler in Mart. Fl. Bras. 12, pt. 2: 52. 1872.

Trees or shrubs with short-strigose or essentially glabrous branches, the bark smooth, and small unisexual or polygamous

flowers in axillary diffuse panicles with strong basal branches or rarely strict, elongate and divaricate in fruit, the very short strigose pedicels articulated above the bract. Calyx broadly and often unevenly 5-lobed. Petals free, glabrous or nearly, the inflexed tip mucronulate, midrib prominent. Filaments medially enlarged or appendaged and there pubescent, abruptly narrowed below the versatile anthers, their ovate cells introrsely longitudinally dehiscent. Ovary in male flowers reduced, either immersed in a fleshy disk or eccentric in orifice of hippocrepiform disk, in the female 1-celled and with a lateral basal fleshy pulviniform avascular appendage, the style obsolete, the stigma fleshy, rugose; ovules 2, nearly collateral. Drupes compressed, with large fleshy appendages on concave side, putamen with two pairs of equal primary ribs on the lateral edges and one median ridge on both sides, intermediate ridges more or less developed on convex side; seed solitary, embryo minute (after Howard).

Discophora guianensis Miers, Ann. Mag. Nat. Hist. ser. 2. 10: 118. 1852; Contr. Bot. 1: 105. 1851–61; 27. *Kummeria brasiliensis* Mart. ex Engler in Mart. Fl. Bras. 12, pt. 2: 52. 1872. *Lasianthera amazonica* Barbosa Rodrigues, Vellosia 1: 12. 1891. ed. 2, fide Howard.

Branches, young leaves and panicles except the flowers more or less sericeous-strigose with silvery or golden trichomes; petioles 1–2.5 cm. long, stout, canaliculate; leaves oblong-lanceolate to elliptic-oblong, acute or rarely rounded at base, 1.5–3 dm. long, 7–13 cm. wide, acute or acuminate, with apically rounded acumen 2(–4) cm. long, coriaceous, revolute-margined, midnerve prominent, strigose beneath, conspicuously reticulate on both sides, the veins 7–10 pairs; calyx campanulate, glabrous except for tips of teeth; petals obovate to elliptic, 2–3 mm. long, glabrous except within inflexed acumen; stamens 3.5–4 mm. long; basal pulvinus in female flowers 1 mm. high, surrounding about half of ovary, stigma strongly rugose; rudiment in male flowers usually completely surrounded by fleshy disk; drupes 2 cm. long, 1 cm. wide, 9 mm. thick, strongly 5-ribbed on the convex surface.—A shrub or tree to 13 meters tall, trunk 1 dm. in diameter. Illustrated, Rodrigues, l.c. *pl. 7;* Engler, l.c. *pl. 12* (inaccurate except for habit, Howard). F.M. Neg. 35916 (*K. brasiliensis*).

Loreto: Balsapuerto, *Klug 3017.* Mishuyacu near Iquitos, *Klug 452; 478; 942.* To British Guiana and Bahia, Brazil.

3. EMMOTUM Desvaux

Reference: Richard A. Howard, Journ. Arnold Arb. 23: 479–493. 1942.

Shrubs or trees with pubescent branches, alternate coriaceous entire leaves and axillary fascicled paniculate bracteate inflorescences, the perfect 5-parted flowers articulated. Calyx campanulate, persisting; petals fleshy, rarely glabrate without but the minute inflexed apex glabrous. Anther cells 2, the fleshy connective bilobed at base, the glabrous broad and flattened filament attached there or dorsally near there. Ovary glabrous or hirsute, often with a fleshy sterile ring of tissue at base, 2–3-celled. Style terminal or slightly eccentric, glabrous. Drupe rarely with 3 seeds, the cotyledons orbicular, the radicle elongate.

Ovary glabrous; mature leaves tawny pubescent beneath. *E. floribundum.*

Ovary hirsute; leaves glabrous at maturity..... *E. glabrum.*

Emmotum floribundum Howard, Journ. Arnold Arb. 23: 487. 1942.

Subterete branches cinereous, pubescent at tips as the narrowly sulcate petioles, these 1.5–2 cm. long; leaves ovate or oblong, rounded at base, acute, 9–12 cm. long, 4.5–5 cm. wide, castaneous, lustrous and glabrous above, shortly appressed castaneous-hirsute beneath, the 10 or 11 subprominent lateral nerves arcuate to the free tips; panicles 3–4-fasciculate, shortly fuscous sericeous; calyx campanulate, 2 mm. broad, 1.3 mm. high, the triangular lobes 0.6 mm. long, slightly wider; petals lanceolate to ovate, about 6 mm. long, 1.5 mm. wide, densely ashy-sericeous without, castaneous or reddish lanate within; stamens to 6 mm. long, incurved, the ovate-oblong anthers 1.2 mm. long, the filaments dilated toward the base; ovary globose, glabrous, 3-celled, the glabrous eccentric style 4 mm. long.—Nearest the Amazonian *E. acuminatum* (Benth.) Miers, 486, with shorter petioles, smaller white flowers. The type was a tree about 15 meters tall with cream-colored flowers (Klug).

Loreto: Mishuyacu near Iquitos, *Klug 1212*, type. "Ingaina."

Emmotum glabrum Benth. ex Miers, Ann. Mag. Nat. Hist. ser. 3. 4: 366. 1859; 488.

Branches slender, terete, shortly cinereous pubescent; petioles 7–9 mm. long, with flaring almost winged sparsely crispose or hirsute margins, canaliculate above; leaves ovate to elliptic, 6–9 cm. long,

3.5–4.5 cm. wide, rounded at base, narrowly attenuate to mucronate acumen 1–1.5 cm. long, glabrous and usually dull above, early short hirsute beneath but soon glabrate, veins almost inconspicuous both sides, irregularly arcuate, free at tips; panicles slender, slightly exceeding the petioles or to 1.5 cm. long, sericeous; calyx campanulate, 2 mm. wide, 1 mm. high, the rounded or acute lobes about 0.6 mm. long, glabrous except tips; petals ovate-lanceolate, 3–3.6 mm. long, to 1 mm. wide, glabrous without but for medial row of pilose trichomes, densely red-brown lanate on mid-nerve within; stamens to 3.6 mm. long, incurved, anther sacs folded inward, the anther attached basally to filament; ovary globose, densely silky hirsute and with differentiated sterile more or less pubescent base; style eccentric, glabrous, to 2 mm. long, 3-toothed or rounded at tip.—The Peruvian specimen was given an herbarium name by Standley; it differs from type in inflorescence shorter than petioles, sterile base of ovary essentially glabrous or with few trichomes, cells abutting on the narrow ends instead of lying parallel, differences I do not consider worthy of specific distinction (Howard). Tree 8 meters tall with cream-colored flowers (Klug). Illustrated, Miers, Contr. Bot. 1. *pl. 22* (as to habit only, Howard). F.M. Neg. 23274.

San Martín: Chazuta, 200 meters, *Klug 3990*. Amazonas, Brazil.

4. PLEURISANTHES Baillon

Reference: Richard A. Howard, Contr. Gray Herb. 142: 41–49. 1942.

Lianas, the terete young stems and branches tendril-like in appearance, the entire or spinose-denticulate leaves pinnately veined with prominent reticulate secondary veins. Inflorescence axillary, supra-axillary or terminal, paniculate or spiciform-racemose, the rachis commonly flattened, the sessile or pedicellate perfect flowers nonarticulated and in bracteate glomerulate usually secund clusters. Calyx with 5 triangular acute lobes, corolla polypetalous, the fleshy petals strigose or tomentulose without, glabrous within with often conspicuous midrib. Stamens 5, the free filaments filiform, the oblong anthers longitudinally dehiscent. Ovary conical, hirsute, 1-celled with two collateral ovules; style minute or developed, the stigma frequently papillose; fruit unknown.

Pleurisanthes flava Sandw. Kew Bull. 467. 1931; 48.

Younger stems, petioles, these flexuose, to 18 mm. long, leaf-nerves beneath and axillary racemes, including the flowers without,

more or less tomentose with often yellowish trichomes; leaves ovate to elliptic-oblong, rounded to subcordate at base, acute or acuminate but acumen broadly obtuse to abruptly mucronate, 6–14 cm. long, 3–7 cm. wide, membranous, lustrous above, pubescent and paler beneath, entire, the veins 7–9 pairs; racemes to 5.5 cm. long, the flowers two-ranked in clusters of 3–5; calyx cupulate, 1.75 mm. wide, teeth acute; petals elliptic, 2.5 mm. long, the stamens somewhat shorter; ovary ovoid, densely pilose; style 0.5 mm. long, glabrous stigma discoid.—*P. simplicifolia* Sleumer, 48, has broadly elliptic leaves, 8–14 cm. long, 5–9 cm. wide, rounded to obtuse or subacuminate; since both species have been found at São Paulo de Olivença, they probably occur, in common with many others, within Peru. Illustrated, Howard, l.c. *pl. 2B*, opposite p. 17.

Peru (probably). To British Guiana.

5. CITRONELLA D. Don

Reference: Richard A. Howard, Contr. Gray Herb. 142: 60–89. 1942.

Villaresia R. & P. Fl. Peruv. 3: 8. *pl. 231*. 1802, not Prodr. 35. 1794. *Briquetina* Macbr. Field Mus. Bot. 11: 26. 1931, fide Howard. *Villaresiopsis* Sleumer, Notizbl. Bot. Gart. Berlin 15: 232. 1940, fide Howard.

Striate terete branches occasionally scandent, the leaves entire or spinose dentate. Inflorescence paniculate or thyrsoid, the axes terete, the perfect or polygamous 5-parted flowers with free apically inflexed but not clavate petals, glabrous within, the midrib soon prominent. Ovary subgibbous, the usually solitary cell with a conspicuous parietal ridge, the 2 ovules pendent from near the apex. Drupe scarcely fleshy, unappendaged, seed hippocrepiform, the embryo small.—Funicle ridge-like along cell-wall, the 2 ovules subapical on each side at maturity, this funicle forming a vertical radial partition, only one ovule developing and the seed finally curved around the partial partition; this character, while found elsewhere, is distinctive for this genus within the family. Leaves of some species have small cavities in vein-axils, often called glands, which may contain pubescence; corolla aestivation peculiar, the fleshy petals with protruding midrib overlap at usually membranous margins and thus have been interpreted as imbricate but actually a modified valvate condition (these observations taken from Howard, Journ. Arnold Arb. 21: 471 et seq. 1940, and also l.c. 62–66.

Leaves with large pores in axils of primary veins, entire, glabrous. *C. melliodora.*

Leaves without large pores as above but with many small ones in secondary axils.

Leaves entire.....*C. incarum.*

Leaves spinose-dentate.....*C. ilicifolia.*

Citronella ilicifolia (Sleumer) Howard, Contr. Gray Herb. 142: 79. 1942. *C. peruviana* Howard, Journ. Arnold Arb. 21: 474. *pl. 4.* 1940, fide Howard. *Villaresiopsis ilicifolia* Sleumer, l.c.

Tree or shrub similar to *C. incarum;* branchlets fulvous hirsute, the young leaves sparsely so both sides; petioles 5–6 mm. long; mature leaves broadly lanceolate or elliptic, 12–18 cm. long, 5–8 cm. wide, rounded and more or less oblique at base, narrowly acute, spinose-dentate with teeth 2 mm. long; inflorescences axillary or extra-axillary, composed of racemose cymes, branchlets 5–10-flowered, recurving at maturity; petals 5 mm. long, 2 mm. wide; stamens to 2.8 mm. long; style 0.8 mm. long, stigma oblique; fruit unknown.—As noted by the author, this species differs from *C. incarum* in the shape of leaves and their spinose margins, those of the younger leaves, however, being only sinuate; since this character is known to be variable in some other species, the exact status of *C. ilicifolia* remains to be established.

Junín: Río de Comas, 2,400 meters, *Weberbauer 6617,* type.

Citronella incarum (Macbr.) Howard, Journ. Arnold Arb. 21: 472. 1940; 77. *Briquetina incarum* Macbr. Field Mus. Bot. 11: 26. 1931. *B. mollis* Sleumer, Notizbl. Bot. Gart. Berlin 15: 231. 1940, fide Howard.

Large tree, the terete glabrous rambling branches with pale brown lustrous bark; branchlets and peduncles of the racemosely disposed short spikes (2 cm. long) glabrate or sparsely puberulent; petioles stout, 7–15 mm. long; leaves nearly elliptic or broadly ovate-elliptic, more or less oblique at base, shortly and obtusely acuminate, mostly about 1.5 dm. long, 6–8 cm. wide, coriaceous, barely lustrous above, opaque and early hirsute-tomentose or sometimes with a few short crisp trichomes beneath, entire, undulately and very narrowly cartilaginous-margined; nerves scarcely obvious above but strongly prominent beneath with the transverse veins; pores present in axils of secondary veins but absent from the primary; inflorescences 5–13

cm. long, lax, rarely 2 cm. broad even in fruit, the short (5–10–20 mm. long) branchlets strongly incurved-recurved and densely flowered; flowers sessile, yellowish green, rather fulvous pilose, the calyx shortly 4–5-lobed, 1.2 mm. high; petals 5, valvate, free, glabrous but minutely papillose, about 1.25–2 cm. long, suboblong, definitely narrowed at middle and inflexed, with elevated medial nerve but unappendaged; stamens 5, little shorter than petals and alternate with them, the glabrous filaments much dilated, thus cuneate; anthers erect, cells ovate-oblong, connective not at all enlarged; disk none; ovary free, 1-celled, ovoid; ovules 2 or apparently only one commonly developing, pendulous; drupes ellipsoid, ligneous, obtuse, about 1 cm. in diameter.—Howard has shown that this is properly a part of this group considered as including both old and new world species, which seems to be the correct interpretation; cf. Howard, l.c. 21: 476–477.

Huánuco: Muña, about 2,200 meters, *4050*, type. Yanano, 2,000 meters, *3748*.—San Martín: Juanjuí, *Klug 3807*.—Libertad: Valley of Mishiollo below Ongón, *Weberbauer 7056*.

Citronella melliodora (Sleumer) Howard, Contr. Gray Herb. 142: 77. 1942. *Briquetina melliodora* Sleumer, Notizbl. Bot. Gart. Berlin 15: 230. 1940.

Branches glabrous; petioles 12–17 mm. long; leaves oblong, rarely ovate-oblong, scarcely inequilateral at the broadly cuneate or rounded base, acuminate with subacute curved acumen 1.5–2 cm. long, entire, 18–25 cm. long, 7–19 cm. wide, subcoriaceous, lustrous both sides, the 4–5 pairs of primary veins with pores in their axils; inflorescence 6–10 (20) cm. long, rachis laxly pilose, the cymes obviously peduncled; flowers fragrant, subsessile, the scarious bracts ciliate, the pubescent ovate sepals 1 mm. long; petals oblong, 1.5 mm. long, glabrous, yellow; stamens half as long, with subulate filaments and ovate-oblong anthers; ovary ovoid, glabrous, the short style with subcapitate stigma; fruit unknown.—Not seen by Howard, who notes that ex char. it differs from *C. incarum* only in the possession of pores in the vein axils, and has a sweet odor. A tree 12–15 meters tall with trunk diameter of 2–3 dm.

Loreto: Mouth of the Santiago, (*Tessmann 4474*, type).

6. **PORAQUEIBA** Aublet

Reference: Richard A. Howard, Contr. Gray Herb. 142: 49–58. 1942.

Trees, the veins of the coriaceous entire leaves weakly if at all anastomosing near the margin, the paniculate axillary inflorescence strongly branched from base, the articulated flowers subtended by 3 imbricate pubescent bracts, the buds globose. Calyx lobes 5, fleshy, lightly imbricate; petal edges incurved, midrib prominent, furrowed and more or less white silky pubescent. Stamens with fleshy flattened glabrous filaments, erect anthers with broad connective extended to inflexed tip, dehiscence lateral. Disk none. Ovary globose, glabrous, 1-celled, the shorter style terminal, capitate, the stigma minute. Drupes somewhat oblique, fleshy, the woody and smooth endocarp with a longitudinal ridge around the fruit, the cotyledons foliaceous.

Cultivated in Brazil for the abundant starch and oil in the fruits, which are edible; the pulp according to Le Cointe contains 12 per cent of its weight in oil.

Poraqueiba sericea Tul. Ann. Sci. Nat. sér. 3. 11: 172. 1849; 56.

Terete often striate branches sericeous to glabrate as the younger leaves beneath and inflorescence including the flowers without; petioles 2–4 cm. long, deeply canaliculate, usually 4-angulate; leaves broadly elliptic-ovate, rounded at base, 17–24 cm. long, 8–15 cm. wide, acuminate, the acumen obtuse, rounded or emarginate, 10–22 mm. long, the adult glabrous above, glabrate beneath, coriaceous, midrib strongly sulcate above, veins 7–9 pairs; inflorescence 5–10 cm. long; calyx 2.3 mm. wide, ovate lobes 1 mm. long and wide; petals ovate-lanceolate, 3–4 mm. long, densely villous on ridges inside, transverse ridge lacking; style stout; filaments 1 mm. wide; drupes ovate-oblong, slightly compressed, 6–8 cm. long, 4.5–6 cm. in diameter, in Peru yellowish-green when mature and fresh (Williams).—Attains 30 meters (Krukoff and Ducke), the straight trunk with a diameter of 6 dm., the crown spreading, bark purplish or dark brown, the wood compact and used for carpentry, according to Williams, who has also given the anatomy, Field Mus. Bot. 15: 291. 1936.

Loreto: Iquitos, *Killip & Smith 29837; Williams 8078; 8080.* Caballo-Cocha, *Williams 2099.* Amazonian Brazil. "Umari," "umari amarillo," "umari negro" (all Williams); "umari roco," "mary negro," "mari preto."

7. LERETIA Vellozo

Reference: Richard A. Howard, Journ. Arnold Arb. 23: 58–60. 1942.

Lianas, or at least the branches scandent, lenticels inconspicuous, leaves entire, alternate, short-petioled, inflorescences axillary much-branched peduncled cymes or panicles, the flowers articulated to short bracteate pedicels. Calyx lobes 5, subacute to rounded. Petals and stamens 5 (4), the former valvate with inflexed tips, the latter with arcuate filaments arcuately affixed dorsally, the linear connective usually prolonged into an obscure tip. Two styles usually abortive, the functional glabrous. Ovary with columniform base, pubescent at least within, ovules 2, pendent, disk lacking. Fruit drupaceous, large, with thin and dry mesocarp, pubescent within; funicle in a tubular canal in the putamen; cotyledons folded, not displaced laterally, their margins superimposed.—The genus *Mappia* Jacq., not yet known from Peru, has ebracteate pedicels, terminal style, filaments affixed to base of connective, funicle in the mesocarp (all after Howard).

Leretia cordata Vell. Fl. Flum. 99. 1825; 58. *Mappia Poeppigiana* Baillon, Adansonia 11: 175. 1874, fide Howard. *L. nitida* Miers, Ann. Mag. Nat. Hist. ser. 3. 4: 365. 1859, fide Baehni. *Icacina*(?) *Poeppigiana* (Baillon) Valeton, Crit. Overz. Olac. 187. 1886. *L. Poeppigiana* (Baillon) Sleumer, Notizbl. Bot. Gart. Berlin 15: 245. 1940.

Branches red-brown, early appressed short-strigose becoming glabrate and with darker corky bark; petioles stout, 8–15 mm. long, commonly twisted, glabrate and corky in age; leaves ovate-lanceolate to oblong or elliptic, acute or rounded at base, acute and apiculate to rounded or obtuse, 10–19 (30) cm. long, 4–12 cm. wide, dark green and often lustrous above where early sparsely white-pilose, usually whitish or yellowish beneath with malpighiaceous trichomes or rarely with weak stellate clusters of pilose trichomes, the stout midrib strigose, laterals 6–8, veins many; inflorescences to 18 cm. long, 10 cm. wide, strigose, the peduncles, pedicels (these 2–4 mm. long), and teeth of patelliform calyces densely so, the trichomes golden; petals at maturity 4.8–5.5 mm. long, about 2 mm. wide, densely hirsute without, long-pilose or tomentose within except for the inflexed tip; ovary densely pubescent within, rudimentary styles minute; fruit acute both ends or narrowed to base, finally glabrate, scarcely woody, 3.5–4.5 cm. long, 2–2.5 cm. wide, 1.5–2 cm. thick, the seed to 2.5 cm. long, the raphe extended obliquely to a circular chalaza near base.—Illustrated, Mart. Fl. Bras. 12, pt. 2. *pl. 11* (as *M. nitida*); Baehni, Candollea 7. *pl. 4* (as *M. cordata* and

M. Poeppigiana). F.M. Negs. 23278 (*L. nitida*); 35915 (*M. Poeppigiana*).

San Martín: Tarapoto, *Williams 6842; Spruce 4492.* Juanjuí, *Klug 3892.*—Loreto: Yurimaguas, *Poeppig 2329* (type, *L. Poeppigiana*). Puerto Arturo, *Killip & Smith 27869.* Mishuyacu near Iquitos, *Klug 345; 641; 666; 1215.* Caballo-Cocha, *Williams 2067; 2055; 2084.* Iquitos, *Williams 3541.* Peru-Colombian boundary, *Klug 1633.* Brazil to British Guiana. "Puca-yacu" (Williams).

8. HUMIRIANTHERA Huber

Reference: Richard A. Howard, Journ. Arnold Arb. 23: 73. 1942.

More or less scandent rhizomatous shrubs, the large rhizomes sometimes tuberiform, the leaves alternate, usually membranous, entire, the flowers perfect, in terminal or pseudoaxillary cymes articulated at base of deeply lobed calyx to bracteate pedicels. Petals ovate to lanceolate, valvate, appressed pubescent without, villous or crispose pubescent within, inflexed at tip. Stamens free, the filaments thickened below, inflexed toward attenuate tip, the connective triangular, broadest at base and extending beyond the globose or oblong anther sacs; style incurved, glabrous; otherwise much like *Leretia.*

Howard, Contr. Gray Herb. 142: 58. 1942, has suggested that *Casimirella* Hassler, Repert. Sp. Nov. 12: 249. 1913, may prove to be an earlier name but he notes several technical points which from character remain vague.

The starchy material of the tubers, these in at least one species said to attain as much as 4 dm. in diameter, to weigh nearly 100 kilos and to yield 16 kilos of starch, may be used as food when powdered and repeatedly boiled to remove a poisonous substance; cf. Howard, who draws upon Ducke, Arch. Jard. Bot. Rio 4: 118. 1925, and Le Cointe, Arvores e Plantes Uteis 457. 1934.

Humirianthera ampla (Miers) Baehni, Candollea 7: 182. 1936; 76. *Leretia ampla* Miers, Ann. Mag. Nat. Hist. ser. 3. 4: 364. 1859. *Mappia ampla* (Miers) Engler in Mart. Fl. Bras. 12, pt. 2: 51. 1872. *H. Duckei* Huber, Bull. Soc. Bot. Genève sér. 2. 6: 184. 1914, fide Baehni.

Young branches glabrous, lenticels conspicuous; petioles 8–10 mm. long, glabrate as the inflorescence and leaves in age, the pubescence usually simple, the trichomes rarely clustered; leaves broadly

lanceolate to elliptic, subacute to rounded at base, obtuse to acuminate at tip, 8–20 cm. long, 3–10 cm. wide; veins arcuate and strongly anastomosing; calyx lobes densely hirsute; petals ovate above, 3.5–4.3 mm. long, strigose without, villose to rarely slightly crispose within except inflexed tip; mature anther sacs at most one-third length of anther; connective extension 0.6–0.8 mm. long; ovary hirsute; style glabrous.—Illustrated, Valeton, Crit. Overz. Olac. *pl. 5, fig. 31.* 1886. F.M. Negs. 23270 (*H. Duckei*); 23277.

Baehni was the first to designate this as the type of Huber's genus, which consists to date of two other species: *H. rupestris* Ducke, 75, and *H. crispula* Howard, 77. The former, of Amazonian Brazil, has reddish-brown stellate pubescence, veins weakly anastomosing at margins, petals glabrous below; the latter, Colombian, resembles *H. ampla* but is yellow-brown stellate, petals with trichomes within, curly-crispose to base, broader leaves slightly plicate or cordate and anther sacs one-half to two-thirds length of anthers; all these are to be expected within Amazonian Peru.

Peru (probably). Amazonian Venezuela and Brazil. "Mandioca ossu" (Le Cointe), "maria," "apolo" (Ducke).

STAPHYLEACEAE

Reference: Joh. Krause in Pflanzenfamilien ed. 2. 20b: 255–321. 1942.

Shrubs or sometimes trees with various 1–3-foliate or odd-pinnate (rarely simple) leaves usually with binate stipules and stipels and small perfect or polygamous flowers in axillary or terminal panicles. Sepals and petals 5, imbricate, the latter inserted on or below the hypogynous crenate or lobate disk and accompanied alternately by the 5 free stamens. Anthers 2-celled, longitudinally dehiscent. Ovary 2–3-celled and lobed, the styles at least finally free; ovules few to many in 1–2 series on the ventral suture. Fruit a membranous inflated capsule opening apically or sometimes indehiscent and fleshy, with 1–few seeds, these truncate at base with scanty endosperm, straight embryo, the cotyledons plano-convex.

Leaves opposite; sepals free.....1. *Turpinia.*
Leaves alternate; sepals united about one third.....2. *Huertea.*

1. TURPINIA Ventenat

Shrubs with odd pinnate or rarely simple leaves, the leaflets opposite and small white flowers in terminal panicles. Calyces

persisting, the sessile petals suborbicular. Filaments complanate. Ovules few, anatropous. Fruit subglobose, fleshy at least slightly, 3-celled, the seeds compressed.

Turpinia heterophylla (R. & P.) Tul. Ann. Sci. Nat. sér. 3. 6: 363. 1846. *Staphylea heterophylla* R. & P. Fl. Peruv. 3: 29. *pl. 253.* 1802.

Branches slender, terete, spreading, subvaginate at nodes, smooth; petioles elongate, the short petiolules canaliculate, the pinnate leaves with often 5 (3–7) oblong-lanceolate to ovate-oblong glabrous acutely acuminate serrate leaflets often 8–12 cm. long, 3–5 cm. wide, lustrous, at maturity more or less pubescent and nervose beneath but green both sides; panicles usually little longer than broad; bractlets subulate, deciduous; pedicels 3–5 mm. long; calyx white or purplish, the oval sepals unequal, at least one persisting; petals white, suboblong, concave, nearly equaled by the filaments; styles 3; capsules obscurely 3-lobed, seeds two in each cell.—Trunk stout with leafy crown (Ruiz & Pavón). Harms, Notizbl. Bot. Gart. Berlin 14: 335–336. 1939, called attention to the publication of Tulasne overlooked by him, by Loesener, Bot. Jahrb. 37: 575. 1906, and even by the careful Briquet, Ann. Cons. Jard. Bot. Genève 20: 423. 1919! *T. megaphylla* Tul. l.c., 361, of Ecuador, perhaps to be expected within Peru, has 1–2 pairs of larger leaflets (often 10–15 cm. long, half as wide) narrowed at base, densely white pubescent beneath, ample panicles 3 dm. long, flowers subsessile. F.M. Neg. 13380.

Cajamarca: Cutervo, *Raimondi* (det. Harms). Tambillo, *Jelski 414.*—San Martín: San Roque, *Williams 7099.*—Huánuco: Chinchao, *Sawada 54.* Mesaporta and Muña, *Ruiz & Pavón,* type.—Huancayo: Río Mantaro, 2,500 meters, *Weberbauer 6564.*—Puno: Near Puno, *Soukup 27.* To Colombia. "Yaua-nullaca," "inquinca."

2. HUERTEA R. & P.

Tall trees with reddish wood, terete branches and alternate leaves, these with 8–10 pairs of more or less cordate and acute petiolulate leaflets that are glandular dentate and deciduously stipellate glandular. Flowers small, many on delicate, apparently not articulated pedicels, the lax inflorescences rather yellowish pubescent above the bracts becoming strongly reduced. Sepals and petals 5 or 6, the outer sepals persisting, scarcely if at all exceeded by the imbricate

pubescent petals, the 5 or 6 stamens alternate to these, somewhat longer and themselves alternate to the small disk lobes. Ovary 2-celled only at base, style short with 2 spreading stigmas, the ovules solitary on inner side of each cell. Fruit drupaceous, obovoid, 1-seeded.—Named for the Spanish scholar (1579–1649) Hieronymus de Huerta, who translated Pliny with comments.

Huertea glandulosa R. & P. Fl. Peruv. 3: 4. *pl. 227, fig. a.* 1802.

Tall thick-stemmed tree; leaves to 3 dm. long; leaflets lustrous above, somewhat pubescent beneath; petioles and petiolules with two dark glands at base which however are soon caducous; flowers 2 mm. in diameter; sepals oval, acutish, united at most only one third.—The position of this still imperfectly known tree has long been open to question and at one time it was confused with *Crepidospermum Goudotianum* (Tul.) Tr. & Planch. of the Burseraceae, and suggested as possibly belonging to various other botanical families.

Huánuco: Muña, *Ruiz & Pavón*, type. "Cedro macho."

CALLITRICHACEAE. Water Starwort Family [1]

By Norman C. Fassett

Fragile herbs in shallow water, often maturing emersed, in drying pools or on muddy banks, or in Peru between Distichia and other polsters of the wet highlands. Leaves opposite, estipulate, entire, sometimes forming a rosette at the ends of the branches, usually pitted, the floating 3-, the submersed 1-nerved. Flowers monoecious, almost minute, axillary, solitary or 2–3 together, without perianth but often with 2 membranous sometimes inflated bracts. Stamen 1, the cordate laterally dehiscent anther on filiform filament; female flowers with 4-celled ovary, ovules 1 in each cell, styles 2, filiform, papillose. Fruit compressed, emarginate or 4-lobed and separating finally into 4 1-seeded carpels.

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[1] Herbert L. Mason, as reported by Jepson, Fl. Calif. 2: 433. 1936, observed that *C. marginata* Torr. and at least some other species may have 1–3 male flowers in an axil, sometimes accompanied by 1 female flower, or the flower, when solitary, either sex. Dr. Fassett has kindly supplied the key and species descriptions, including however *C. turfosa* and *C. deflexa* at my suggestion. The generic description has been omitted as it would only repeat the family characters.—J.F.M.

CALLITRICHE L.

Plants usually aquatic, with opposite linear submersed leaves or a rosette of rotund leaves or both; fruit 1.2–1.4 mm. wide, the width equaled or exceeded by the height; margins of carpels wingless.....*C. heteropoda.*

Plants terrestrial or subterrestrial with essentially uniform spathulate leaves; fruit 0.9 mm. or less wide, the width exceeding the height; carpels narrowly winged.

Height of fruit 0.6–0.8 mm., 0.1 mm. less than the width; face of mericarps plump.....*C. turfosa.*

Height of fruit 0.3–0.5(–0.6) mm., 0.2 mm. less than width; face of mericarp nearly flat.....*C. deflexa.*

Callitriche deflexa A. Br. ex Hegelm. Monogr. Gatt. Callitriche 58. *pl. 3.* 1864. *C. deflexa* A. Br. var. *subsessilis* Fassett, Rhodora, 53: 150. 1951. *C. deflexa* A. Br. var. *Austini* Hegelm. as to South American plants but excluding North American cotypes.

Fruits 0.5–0.7(–0.8) mm. wide, 0.3–0.5(–0.6) mm. high on pedicels 0.1–0.3 mm. long; wings of carpels 0.03–0.05 mm. wide, a little narrower toward the base of the fruits; leaves 2–4 mm. long, 0.8–2.3 mm. wide, the midrib and often the two lateral veins evident.—A specimen by Weberbauer from near Poto, Puno, determined at Dahlem as *C. marginata* Torr., could possibly be this.

Peru (possibly). Mexico to Argentina.

Callitriche heteropoda Engelm. ex Hegelm. Verh. Bot. Ver. Brandenb. 9: 40. 1867.

Fruit 1.2–1.4 mm. wide, 1.2–1.5 mm. high, the height equaling or slightly exceeding the width; edges of carpels wingless, rounded or very obtusely angled with a broad V-shaped commissural groove between them; fruit sessile or on pedicels up to 15 mm. long on the same plant; leaves linear and 1-nerved below and broadly ovate above or all of the ovate-rotund type, or, when plants are stranded on shore, oblong and of firmer texture.—The Pennell specimen seen has leaves 4–10 mm. long, 2–8 mm. wide. The specimen listed by Weberbauer, 219, from Poto, Puno, above 4,000 meters between Distichia polsters, may belong here but compare *C. deflexa.*

Cuzco: Pools in Distichia moor, 4,200–4,500 meters, La Raya, *Pennell 13493* (det. Fassett). Northwestern Bolivia.

Callitriche turfosa Bert. emend. Hegelm. Monogr. Gatt. Callitriche 59. 1864, in part; Hegelm. Verh. Bot. Ver. Brandenb. 9: 13. 1867. *C. turfosa* Bert. Amer. Journ. Sci. 19: 308. 1831, nomen nudum.

Fruits 0.7–0.9 mm. wide, 0.6–0.8 mm. high, very narrowly and evenly winged all around, sessile or on peduncles up to 0.4 mm. long; mericarps plump, thinner toward the margins; leaves essentially uniform, 2–4 mm. long, 0.75–1.5 mm. wide, 3-nerved.—In damp soil and shallow water. *C. platycarpa* Kuetz. of Ecuador has fruits twice as large with longer wings. Since Fassett has no record of the following specimen the determination may be my error. Illustrated, Hegelmaier, l.c. *pl. 3, fig. 4* (fruit).

Junín: Carapata above Huacapistana, *Killip & Smith 24386* (det. Fassett). Ecuador to northern Chile and eastern Argentina.

CORIARIACEAE. Coriaria Family

Shrub (Peru) with opposite branches and leaves (or the former ternate below) and perfect or subpolygamous small flowers borne in slender racemes. Sepals 5, imbricate in bud, persisting and spreading, the shorter hypogynous petals fleshy and carinate within, becoming thicker and intruded between the fruit carpels, the 10 stamens free or 5 adherent to petals. Carpels 5–10, adnate in a whorl about the fleshy conic torus, 1-celled, the styles same number, free, long and stigmatose all around; ovules solitary, pendulous. Fruit of 5 or more carpels included in the accrescent petals, compressed and carinate laterally and dorsally.

CORIARIA L.

A single genus of few species, the Mediterranean *C. myrtifolia* L., like the Peruvian, rich in tannin and also furnishing a black dye.

Coriaria thymifolia Humb. & Bonpl. ex Willd. Sp. Pl. 4: 819. 1806.

Slender-stemmed, the usually spreading-recurving branches suggesting fern fronds because of the many small approximate leaves disposed in one plane; glabrate or lightly puberulent except the rachis of the racemes densely so; leaves sessile or subsessile, oblongish, acute, a cm. or 2 long, 5–12 (20) mm. wide, prominently nerved; flowers 2 mm. long, reddish and green; fruits globose, 3–4 mm. thick, juicy, dark purple.—Often forms hedge-like thickets sometimes 1–3

meters tall, especially along brooks between 2,000 and 3,200 meters (Weberbauer). Illustrated, HBK. Nov. Gen. & Sp. 7: *pl. 636.*

The plant is poisonous to species of llama (Herrera); and with the racemes the Indians dye their cotton and wool (Ruiz & Pavón).

Cajamarca: Valley of the Llaucan by Hualgayoc, *Weberbauer 4043;* 261. Cutervo, *Raimondi.*—Huánuco: San Rafael, *Soukup 2245.* Mito, *1525.* Pampayacu, *Kanehira 230.*—Junín: Near Tarma, *Ruiz & Pavón.* Vitoc, *Isern 2290.* Huacapistana, *Weberbauer 2008;* 246. Uspachaca, *1320.*—Huancavelica: Near Surcubamba, *Stork & Horton 10343.*—Ayacucho: Aína, *Killip & Smith 23119.*—Apurímac: *Raimondi.* Huancarama to Cochacaya, *West 3761.* Marcapata, *Vargas 9701; 1354.*—Cuzco: Mollepata, Valley Apurímac, *Herrera 1185.* Pillahuata, *Pennell 14131; West 7085.* Achirani, *Vargas 11112.* Ollantaytambo, *Cook & Gilbert 607.* Valley Paucartambo, *Herrera 2969.* Valley Urubamba, Weberbauer, 243.—Puno: Valley Sandía, *Weberbauer 554;* 237. To Mexico. "Miyo-miyo," "llama-miyo" (Herrera), "saca-saca" (Raimondi), "mio," "mio-mio," "chanche" (Bonpland).

JULIANIACEAE. Juliania Family

For this family, which might be sought here since some regard it as related to Anacardiaceae, see this work part 2, no. 2: 266–267. 1937. Record has shown that the wood structure suggests that it may actually be near Burseraceae or here.

ANACARDIACEAE. Cashew Family

Reference: Engler in DC. Monogr. Phan. 4: 171–500. 1883.

Shrubs, sometimes scandent, or trees with alternate (Peru) estipulate simple 1–3-foliate or (rarely odd-) pinnate leaves, normally epunctate, and small perfect or polygamous usually regular flowers in axillary or terminal panicles. Calyx 3–7-parted, more or less deeply, sometimes completely, rarely spathaceous or irregularly ruptured; petals ordinarily same number, infrequently wanting or persisting; stamens commonly twice as many, rarely fewer or more numerous inserted at base of the usually annular disk. Ovary 1(2–5)-celled, rarely with distinct carpels; styles 1–3; ovules solitary, pendulous or ascending. Fruit superior, infrequently semi-inferior, sometimes inserted upon the accrescent and fleshy calyx-base and pedicel (hypocarp), but usually a drupe (seldom dehiscing). Endosperm none or scant.—The family is further characterized by the

presence of an oil or resin and a more or less caustic sap that may occur even in the fruit.

Cashew and pistachio nuts, mangos and mulli or molle trees as well as species of mayco (*Rhus* and *Mauria*) that may irritate the skin when touched, are among a few of the members of this varied family. All these are described below except *Pistacia* (*P. vera* L.), which strangely seems to be rarely if at all cultivated.

For convenience the following key applies only to the Peruvian species; the genera are illustrated, Engler, l.c. *pls. 4–15*, flowers and fruits.

Leaves simple.

Leaves sessile or subsessile, nearly linear; female flowers apetalous. 10. *Haplorhus.*

Leaves petioled, broader; petals present in both sexes.

Carpels solitary; style excentric and filiform or lateral, stigma simple.

Stamens 8–10, several or all fertile; style excentric; fruit receptacle enlarged, topped by nut-like drupe. 1. *Anacardium.*

Stamens 1 or 4–5, 1–2 fertile; style lateral; fruit fleshy. 2. *Mangifera.*

Carpels 3; style short with 3 stigmas; fertile stamens 10.

Leaves 7 cm. long or longer (one species); drupes compressed. 5. *Mauria.*

Leaves about 4 cm. long or shorter (two species); drupes globose.....6. *Schinus.*

Leaves pinnate, rarely 1–3-foliate.

Stamens (8) 10, that is, usually twice as many as petals.

Styles and ovary cells (3) 4–5; drupes ovoid or subglobose, edible.

Leaflets 5–12 pairs; calyx deciduous; stigmas spathulate. 3. *Spondias.*

Leaflets 2–5 pairs; calyx persisting; stigmas rounded. 4. *Tapirira.*

Style 1, sometimes trifid; ovary 1-celled; drupes inedible.

Leaflets petiolulate; drupes compressed, endocarp chartaceous. 5. *Mauria.*

Leaflets sessile; drupes globose, endocarp osseous.6. *Schinus.*

Stamens only as many as petals or sepals.
Drupes subglobose; leaflets (Peru) many, petiolulate..7. *Rhus.*
Drupes compressed, subalate or alate apically; leaflets, if many, sessile.
Leaflets 2–4 pairs, petiolulate.....8. *Loxopterygium.*
Leaflets many pairs, sessile.....9. *Schinopsis.*

1. ANACARDIUM L.

Evergreen trees with petioled or sessile entire coriaceous leaves and small bracteate polygamous flowers borne in terminal panicles. Calyx divisions as narrow petals imbricate, 5, the latter recurving. Torus spiciform, occupying the calyx base and adnate to the more or less unequal connate filaments of the often only partly fertile stamens. Ovary free, sessile, 1-celled with slender excentric style, the stigma punctiform; ovule lateral, ascending on a very short funicle. Fruit reniform, laterally compressed, umbilicate by a lateral sinus borne on a pyriform conspicuously enlarged fleshy hypocarp.

The peculiar fruits of the popular Marañón, when mature pendent in clusters from the medium-sized tree, consist, at least colloquially, of a lower rather spongy but juicy obovoid portion, reddish-yellow, sweet-acid and astringent, pleasant fresh, preserved or as a flavor, and an upper much smaller kidney-shaped part (the actual fruit) which encloses the well-known cashew nut, edible only after roasting, since its hull contains a resinous irritant (anacardic acid and cardol, a caustic oil) that must be avoided with care when eating the fruit-like base upon which it rests.

Anacardium occidentale L. Sp. Pl. 383. 1753; 219.

Smooth, glabrous, the branchlets densely leafy toward the tips; petioles 1–1.5 cm. long; leaves broadly oblong-obovate, rounded, truncate or slightly emarginate at tip, often 1–1.5 dm. long, 6–8 cm. wide; panicles a dm. or two long with slightly pilose bracts 5–10 mm. long; pedicels 2–3 mm. long; flowers yellowish green with roseate stripes, calyx segments lanceolate, petals 7–8 mm. long, puberulent without; stamens very unequal, connate only at base; hypocarp to 7 cm. long, 5 cm. thick, fruit 2–2.5 cm. long, 1.5 cm. broad, the reniform seed 1.5–2 cm. long, 1 cm. broad.—Related species or forms native to the upper Amazonian areas include *A. giganteum* Hancock with semiovate calyx segments much shorter than petals and *A.*

Spruceanum Benth. with longer petioles, filaments connate into a tube. Illustrated, Chicago Nat. Hist. Mus. Pop. Ser. 26: 47.

San Martín: Tarapoto, *Williams 5548.*—Junín: Río Perené, clearing, *Killip & Smith 25118.* La Merced, *5479.*—Loreto: Cultivated, Nanay, *Williams 400; 483.* Near Iquitos, *Williams 1388.* Caballo-Cocha, *Williams 2183.* Brazil; generally planted and often naturalized in tropical regions of both hemispheres. "Marañón," "cashew," "caju," "casu."

2. MANGIFERA L.

Popular shade and fruit tree with petioled entire deep green but often reddish-tinged early and in age coriaceous leaves crowded at the ends of the many branchlets, these early slightly puberulent toward the tips, and polygamo-dioecious bracteate flowers in much-branched terminal panicles. Sepals and petals imbricate, 4–5. Stamens 1 or 4–5, connate below and with pulvinate or stipitiform disk, 1–2 fertile. Ovary free, sessile, 1-celled, compressed with lateral or subterminal curved style, the stigma simple; ovule 1, ascending. Drupe ovoid or subreniform, fleshy, with a mass of fibers (more or less reduced in cultivated forms) holding the somewhat flattened seed.

The greenish-yellow usually pink-tinged mango, very juicy and with sweet aromatic flavor, often with a suggestion of turpentine (this in better cultivated forms largely lacking), is probably the most appreciated of the tropical fruits. Its cultivation in Peru is not as frequent as would be expected but Williams found it planted extensively in the northern departments. It has a curious tendency, as the avocado, of often bearing flowers at one time only on part or perhaps half of the tree, the contrast being great because the flowers are usually abundant.

Mangifera indica L. Sp. Pl. 200. 1753; 198.

Becoming a tall tree, the densely leafy crown spreading, the trunk sometimes a meter in diameter; leaves usually narrowly oblong-lanceolate, 1–2 dm. long, 5–8 cm. wide, acute or acuminate both ends; sepals to 2.5 mm. long, pilose, the narrow apically recurved petals twice as long; fertile stamens 1–2; fruit often oblong-ovoid and slightly lop-sided; varying from small to large in cultivated trees. Illustrated, Chicago Nat. Hist. Mus. Pop. Ser. 26: 4; Engler, l.c. *pl. 4, figs. 10–12.*

Ancash: River flat, Yaután, *2567.*—Junín: Puerto Bermudez, *Killip & Smith 26471.*—Loreto: Yurimaguas, *Williams 3980; 4519.* Caballo-Cocha, *Williams 2354.* Iquitos, *Klug 1477.*—Cuzco: Valle de Santa Ana, Hacienda Huadquiña, *Herrera 3612.* Southern Asia. "Mango."

3. SPONDIAS L.

Branches below the crowded odd-pinnate often ample leaves roughened by petiolar scars and lenticels, glabrous. Leaflets many pairs, petiolulate or sessile, more or less oblique at base, acuminate. Flowers usually pedicellate in pyramidal terminal or lateral panicles, polygamous, the subimbricate calyx lobes small, the 4–5 spreading petals valvate in bud. Stamens 9–10 inserted below the cupulate crenate disk. Ovary sessile, free, 4–5-celled with as many styles connivent above; ovules solitary, pendulous. Fruit a fleshy drupe with a large osseous stone. Embryo straight.

The yellow and red mombin ("ciruela agria") are smaller than mangos, ovoid or plum-like with subacid aromatic thin flesh, fibrous, especially the yellow species; according to Williams both are planted commonly in lowlands of Loreto, where persisting in thickets.

Leaflets subsessile or shortly petiolulate, mostly 2–3 (5) cm. long, rounded to acute.....*S. purpurea.*

Leaflets well-petiolulate, often 6–10 cm. long, acuminate.*S. Mombin.*

Spondias Mombin L. Sp. Pl. 371. 1753; 244. *S. lutea* L. Sp. Pl. ed. 2: 613. 1762.

Becoming a tall tree, the small fragrant white flowers conspicuous from the abundance of the often ample panicles; leaflets thin, 5–9 pairs, oblong or ovate-oblong, 2.5–4 cm. wide, usually pilose on the 8–10 subparallel spreading lateral nerves; petals 3 mm. long, reflexing, equaled by the stamens; fruit yellow, ovoid, ordinarily 3–4 cm. long. —Illustrated, Chicago Nat. Hist. Mus. Pop. Ser. 26: 14.

Grown at Surco near Lima, according to Ruiz and Pavón. Only a few of the many collections by Williams and others are cited.

Loreto: Frequent in thickets, Lower Itaya, *Williams 217; 258; 259.* Río Mazán, *José Schunke 250* (det. Standley). Lower Nanay. *Williams 408.* Pebas, *Williams 1761.* Caballo-Cocha, *Williams 2156.* La Victoria, *Williams 2651,* and others. Upper Itaya, *Williams 3401; 3446.* Lower Huallaga, *Williams 4437; 4933.* Near Iquitos, *Williams 8034.*—Río Acre: Mouth of Río Macauhán,

Krukoff 5767. To Brazil and Mexico. "Ciruelas agrias" (Ruiz & Pavón), "tobo de montana," "shungu," "ubo," "uvo," "ushun" (all Williams), "hubus" (Schunke).

Spondias purpurea L. Sp. Pl. ed. 2. 613. 1762; 243.

Often a shrub-tree smaller than *S. Mombin,* the few branches stout and the panicles narrow, only 2–4 cm. long and borne mostly on the larger branches at defoliate nodes, the flowers reddish or purplish; leaflets 5–12 pairs, variable in shape, mostly subsessile; fruit commonly red or purple, sometimes yellow, plum-like or egg-shaped, 3–5 cm. long or larger.—Illustrated, Chicago Nat. Hist. Mus. Pop. Ser. 26: 48; Engler, l.c. *pl. 6, figs. 19–24.*

This species like the other is only in cultivation or naturalized; Ruiz and Pavón noted it at Macora near Huánuco as *S. Mombin,* "its fruit is red and has a bittersweet taste, quite agreeable," but on account of the color this was probably *S. purpurea.* Williams recorded it as fairly common in old clearings in lowlands.

An anomalous specimen by Lorenz and Lescamp from Pucallpa, Huánuco, referred by Standley to *S. Mombin* with query, has leaflets to 5.5 cm. long, 2.5 cm. wide, inflorescence to 1.5 dm. long but this detached; material broken and inadequate, possibly mixed, but of interest especially for the native names "tapiriba" and "mangana decoro."

San Martín: Tarapoto, *Spruce 4093.* Pongo de Cainarachi, *Klug 2610.*—Huánuco: Near Huánuco, *Ruiz & Pavón.*—Loreto: Lower Itaya, *Williams 216.* Near Yurimaguas, *Williams 4207.* To Mexico and the West Indies. "Ciruela agria" (Ruiz & Pavón), "ciruela," "ajuela" (Williams).

4. **TAPIRIRA** Aublet

Shrubs or trees with alternate odd-pinnate leaves and small greenish-yellow polygamo-dioecious flowers borne in axillary or terminal panicles. Calyx segments and oval petals 5, imbricate, the former persisting, the latter more or less spreading. Stamens 10, inserted under 5-lobed disk, exserted in male flowers. Ovary ovoid, free, partly immersed in disk, 1-celled, the short conic styles 4–5 with simple stigmas; ovule laterally pendent. Drupe obliquely subglobose, fleshy, with rugulose-crustaceous stone, the oblong seed with thin testa. Cotyledons large, plano-compressed, the radicle superior; embryo curved.

Branchlets gray-puberulent, glabrate or glabrous; leaflets obtusish or emarginate; petals reflexing.....*T. guianensis.*

Branchlets typically reddish-tomentulose; leaflets cuspidate-acute; petals suberect.....*T. myriantha.*

Tapirira guianensis Aublet, Pl. Guian. 1: 470. *pl. 188.* 1775; 277.

Branchlets and petioles early rusty appressed puberulent; leaves large, often at least 1–2 dm. long, typically with 5–7 distant pairs of variable but mostly about oblong-elliptic leaflets equally narrowed both ends, 4–15 cm. long, often only about a third as wide, the obtusish or emarginate acumen at most 5 mm. long, distinctly petiolulate, membranous, glabrous or beneath on the little prominent nerves minutely puberulent; male panicles ample, much-branched, the larger about equaling the leaves, the dense bracteolate ultimate branches subspicate, the smaller female mostly in leaf-axils; flowers very many, subsessile, slightly puberulent or glabrous, the calyx segments scarcely 1 mm. long and wide, the equally narrow petals 2.5 mm. long, yellow with pale greenish tinge (Williams), reflexed; filaments in male flowers filiform, 3 mm. long; ovary pilose or glabrescent; drupe about 8 mm. long, 6 mm. thick or larger.—Williams, Field Mus. Bot. 15: 288. 1936, has described the tree as 10–25 meters tall, the straight columnar trunk sometimes buttressed and unbranched to one-half the height. It is known in Brazil as "pao pombo" and is said to furnish a wood (described by Williams) of good quality. It seems probable that at least within Peru only one species is concerned; the collections referred by Gross to *T. Marchandii* are glabrous, the broadly elliptic leaflets about half as wide as long.

Loreto: Balsapuerto, *Klug 3008; 3156* (det. Standley). Mishuyacu, *Klug 1377* (det. Gross); *588 & 614* (both det. Gross, *T. Marchandii*); *266* (det. Harms). Lower Nanay, *Williams 652* (det. Gross). Near Iquitos, *Williams 3649* (det. Harms). Yurimaguas, *Williams 3828.*—Río Acre: Mouth of Río Macauhán, *Krukoff 5325; 5565; 5684* (this distr. *T. myriantha?*). Brazil to the Guianas and Colombia. "Isa-paritsi" (Williams); "joy-ey" (Klug); "jemeco" (Klug).

Tapirira myriantha Tr. & Pl. Ann. Sci. Nat. sér. 5. 14: 295. 1872; 279.

Branchlets and petioles appressed reddish pulverulent; leaves typically with 2 pairs (but as determined often 3–4 pairs) of obovate-

oblong leaflets unequal at base, cuspidately acute, the lateral spreading nerves arcuate toward margins, rather prominent beneath; much-branched ample axillary panicles leafless, flowers shortly pedicellate; calyx pilosulous, the segments ovate; petals narrowly oblong, concave, contracted and erose-dentate at tip, not at all reflexed, 3–4 times longer than calyx, glabrous, nearly as long as stamens.—Differs especially from *T. guianensis* in the acute leaflets and the more erect petals erose-dentate at tip (Engler) but in Peru at least the characters seem intangible. Williams specimen from a tree about 20 meters tall, trunk nearly 4 dm. in diameter, exuding when incised some oily or resinous fluid. The following material could apparently be included in *T. guianensis*. Determinations by Standley except as indicated.

San Martín: Pongo de Cainarachi, *Klug 2720*. Zepelacio, *Klug 3294*.—Huánuco: Cuchero, *Poeppig 1333* (det. Engler). South of Monzón, 1,600 meters, *Weberbauer*, 256.—Junín: Chanchamayo, *Schunke 414*.—Loreto: Mishuyacu, *Klug 592* (det. Gross). Florida, *Klug 2137; 2346*. Yurimaguas, *Mexia 6089*. Lower Huallaga, *Williams 4712?* Colombia. "Itil" (Mexia).

5. **MAURIA** Kunth

Trees with odd-pinnate leaves or sometimes in part or all of them simple, the leaflets petiolulate, the shortly pedicelled hermaphrodite or polygamo-dioecious 5-merous flowers in terminal and axillary usually very composite panicles. Calyx short-cupulate with short broad teeth. Petal aestivation valvate. Stamens 10 in hermaphrodite or male flowers, the filaments subulate, anthers dorsifixed. Ovary attenuate into short or obsolete style with broadly 3-lobed stigmas. Drupe compressed, endocarp chartaceous; seed laterally affixed.

Some species (like *Rhus striata*) are said to cause skin irritation, often serious, merely from contact. The species as defined are much alike and probably actually fewer.

Leaves all simple.....*M. simplicifolia.*

Leaves, at least some of them, pinnate.

Leaves obscurely reticulate above, densely and minutely beneath. *M. aurantiodora.*

Leaves obviously reticulate and more laxly both sides.

Pubescence on the leaves beneath conspicuous, soft. *M. Killipii, M. sericea.*

Pubescence on the leaves beneath lacking or obscure.
Leaflets entire or nearly entire.
Leaflets 1–2 pairs, coriaceous, subrigid.
Inflorescence glabrate.....*M. heterophylla.*
Inflorescence densely pubescent.....*M. trichothyrsa.*
Leaflets 2–4 pairs, rather thin or flexible.
Leaflets typically smooth.....*M. biringo.*
Leaflets puberulent or sometimes with tufts of hairs in the nerve axils.....*M. suaveolens.*
Leaflets, at least some, obviously denticulate.
Some of the leaflets entire.....*M. subserrata.*
All of the leaflets denticulate.....*M. denticulata.*

Mauria aurantiodora [Ruiz] Engl. in DC. Monogr. Phan. 4. 326. 1883. *Sorindeia aurantiodora* [Ruiz] Engl. in Mart. Fl. Bras. 12, pt. 2: 391. 1876.

Shrub with fulvous puberulent branchlets and panicles, these terminal, few-branched, scarcely 1 dm. long, the short branchlets 1–2-flowered with rounded bractlets not more than 1 mm. long and fruiting pedicels at most twice as long; petioles 4–7 cm. long; leaflets petiolulate, ovate, obtuse both ends, unequal, the lateral 6–8 cm. long, 4–5 cm. wide, the terminal larger, all with reticulate veins faint even beneath, the lateral rather prominent; calyx lobes rounded, 1 mm. broad; drupes ovoid, little oblique, glabrous, 6–8 cm. long, 4–5 cm. thick.—Ruiz' name was in herb. under *Schinus*. F.M. Neg. 13163.

This is one of several species that, as with *Rhus striata*, the Indians believe cause an irritating skin eruption if one sleeps in their shade; according to Ruiz and Pavón this could be cured in 8–10 days by application of very hot bunches of *Valeriana*, "albergilla." See remarks under *Rhus striata*.

Huánuco: Near Muña, *Ruiz & Pavón*, type. Cueva Grande near Pozuzo, *4810*. Río Pozuzo, *Ruiz & Pavón; Weberbauer 6745; 6750*. "Mayco."

Mauria biringo Tul. Ann. Sci. Nat. sér. 3. 6: 365. 1846; 328.

Densely leafy flowering branchlets erect, the subterete petioles 1.5–2 dm. long or longer, the leaves with 2–3 pairs of thin green oblong leaflets shortly and obtusely acuminate, 8–12 cm. long, 4–6

cm. wide, the reticulate veins prominent both sides, paler beneath, the petiolules 4–5 mm. long; panicles puberulent-pilose, to about 15 cm. long with many-flowered angulate branchlets, the bractlets acute; calyx minutely puberulent with subtriangular ciliolate teeth; petals ovate, acute; disk rather thick; stamens in hermaphrodite flowers half as long as petals; ovary glabrous, contracted into short style which persists on the obliquely ellipsoid drupe, this about 8 mm. long.—The var. *Ruizii* Engler (the typical form) has oblong-elliptic leaves, the lateral nerves ascending, while var. *Weberbaueri* Loes. has the leaflets pilose in the nerve axils. This may prove to be a part of *M. suaveolens* Poepp. & Endl. and *M. heterophylla* HBK., at least almost certainly of the former. F.M. Negs. 13164; 13165 (var.).

Cajamarca: Tambillo, *Jelski 295*.—Junín: Casapí, *Mathews 2104*. Near La Merced, in open wood, *Weberbauer 1935* (type, var. *Weberbaueri*); 282. Without locality, *Ruiz & Pavón* (type, var. *Ruizii*). To Bolivia and Colombia. "Birringo" (Colombia).

Mauria denticulata Macbr. Field Mus. Bot. 8: 122. 1930.

Branches glabrous; petioles of the rarely unifoliate leaves 2–3 mm. long, the leaflets especially toward the tips irregularly mucronate-dentate, ovate-lanceolate, subacute at base where somewhat oblique, gradually and acutely acuminate, about 10 cm. long, 3.5 cm. wide, subcoriaceous, glabrous above or obscurely pubescent on the midnerve, densely fulvous hirsute in the nerve axils beneath, otherwise glabrous, the reticulation prominent; panicles subsessile, lightly hirsutulous, to 1.5 dm. long, the pedicels 2 mm. long; stamens 10, about 1 mm. long, the free filaments and anthers equal and between the lobes of the subannulate disk.—A 3-meter shrub. One or two other species have obscurely or remotely serrulate leaflets but they are essentially entire, not sharply denticulate and there appear to be none with such dense tufts of pubescence in the nerve-axils; of course the range of variation of these apparent differences is unknown and therefore may some day be shown to be without significance.

Ayacucho: Choimacota Valley, *Weberbauer 7546*, type.

Mauria heterophylla HBK. Nov. Gen. & Sp. 7: 13. *pl. 606*. 1824; 327.

Resembles in general *M. simplicifolia* but some of the leaves usually with 1–2 pairs of somewhat less coriaceous ovate, ovate-oblong or elliptic leaflets 8–10 cm. long, 3 cm. wide; panicles some-

times larger; upper bracts acute; petals 3.5 mm. long, oblong, acute; filaments 2 mm. long, anthers ovate.—The var. *puberula* (Tul.) Engl. has leaves pilose in axils of nerves beneath, these obscure above, while var. *contracta* Loes. has the denser inflorescence scarcely half as long as leaves, flowers a little larger. This may prove to be the earlier name for several forms as *M. aurantiodora*, *M. biringo*, *M. suaveolens*.

Cajamarca(?).—Near Celendín, 3,000 meters, *Weberbauer 4247* (type, var. *contracta*).—Piura: Toward Ayavaca, *Bonpland*, type.—Amazonas: Near Chachapoyas, (*Mathews 1458*).—Huánuco: Muña, Vitoc and Chinchao, *3967* (det. Johnston); *Ruiz & Pavón*.—Puno: Valley of Sandía, in rocks, 2,300 meters, Weberbauer 564 (var. *puberula*, det. Loesener); 237. To Colombia and Venezuela. "Caspi" (Colombia).

Mauria Killipii Barkley, Bull. Torrey Club 74: 77. 1947.

Branches striate, conspicuously lenticellate, soon glabrate but tips as stout petioles, these about 2 cm. long, ferruginous pilose; leaves pinnately 3-foliate; petiolules pilose, the lateral 2–4 mm. long, terminal, 6–12 mm. long; leaflets ovate or broadly lanceolate, acute or subacute, broadly cuneate at base, entire, membranous, glabrous above, ferruginous tomentose on nerves beneath, prominently reticulate both sides; panicles axillary and terminal, equaling the leaves; peduncles sparsely pilose as the deltoid ciliate subacute bracts, these 1–1.5 mm. long, subpersisting; calyx about 1.5 mm. wide, with broad pilose lobes 0.3 mm. long; petals ovate, glabrous, 1.3 mm. long; stamens 0.45 mm. long, the rotund yellow anthers 0.3 mm. wide.—Type from a 3–4 meter tree with few branches. In character of inflorescence resembles *M. ovatifolia* Turcz. but apparently is most closely allied to *M. sericea* Loes. with smaller inflorescence and 5–7 leaflets (Barkley); maybe these differences could be expected within a reasonable range of variation. However, the petals of Loesener's species, ex char. are 3 mm. long. Illustrated, Barkley, l.c., opposite p. 78 (photo of type).

Junín: Huacapistana, *Killip & Smith 24182*, type.

Mauria sericea Loes. Bot. Jahrb. 37: 571. 1906.

Branchlets striate-sulcate, subfuscous pubescent, about 5 mm. thick; petioles and petiolules densely pubescent or puberulent as rachis, the former 3–5 cm. long, petiolules 2.5–5 mm. long or that of terminal leaflet to 22 mm. long; leaflets imparipinnate, 2 or mostly

3 pairs, subchartaceous, entire or undulate, ovate-oblong to subelliptic, the lateral more or less obliquely cuneate to base, acute or shortly acuminate, 8–13 cm. long, 2.5–5.5 cm. wide, all puberulent above, on the face sparsely, on the (10) 12–16 lateral nerves rather densely, especially beneath where also slightly hirtellous in the upper nerve axils, the reticulation beneath very dense and fine, the nerves not prominent; panicles few, fasciculate in the axils or branched from base into one composite densely hirtellous or pubescent inflorescence, 7 or 8 cm. long, branches spreading, ultimate pedicels about 1 mm. long, primary carinate deltoid bracts to 3 mm. long; calyx about 3 mm. wide, lobes acuminate; petals narrowly ovate-deltoid, acutish, puberulent without, about 3 mm. long, half as wide; stamens all little shorter than petals; stigma obsoletely 3-lobed.—Seems to be much like *M. ferruginea* Tul. of Colombia, known to me only from description, the leaflets with very prominent nerves (Loesener). Fruits of my specimen immature, 1 cm. long, 7 mm. wide, lustrous, and with a rather pungent aroma.

Junín: Huacapistana to Palca, in shrubs, 1,700 meters, *Weberbauer 1981*, type.—Huánuco: Muña, *3937* (det. Johnston, ex char.).

Mauria simplicifolia HBK. Nov. Gen. & Sp. 7: 13. *pl. 605.* 1824; 326.

Glabrous shrub or small tree without any compound leaves; branchlets 3–4 mm. thick; petioles subterete, 6–7 mm. long; leaves oblong, obtuse both ends, 7–9 cm. long, 3–4 cm. wide, green above, the veins and lateral nerves prominent beneath; panicles terminal, exceeding the leaves, to 1 dm. long, laxly many-flowered, the angulate branchlets 1–3 cm. long, the pedicels longer than the globose buds, puberulent as the ovate obtuse 1–2 mm. long bracts; flowers 5–6-merous with short broad apiculate calyx lobes, ovate acute petals 3 mm. long, more than 1 mm. wide; stamens more than half as long, anthers oblong; disk 10-crenate; ovary with 3-lobed stigma, in the male flower elongate into a thick style; drupe oblong-ovoid, to 9 mm. long, 5–6 mm. broad.—Observed to 10 meters high.

Cajamarca: Cutervo, *Jelski 296.*—Huánuco: Muña, *Ruiz & Pavón.* Chaglla, 3,000 meters, *Weberbauer 6687; 6692.* South and southwest of Panao, *2211; 3582.* Colombia.

Mauria suaveolens Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 77. 1845; 329.

Branchlets minutely puberulent as the leaf nerves (unless in age) and petioles, these terete, 1.5–2 dm. long, petiolules 2–4 mm. long;

leaflets 2–3 pairs, membranous, ovate or ovate-oblong, shortly acuminate, obtusish, 7–10 cm. long, 3–5 cm. wide, fulvous pilose in the axils of the nerves beneath, these with the reticulate veins prominent; panicles ample, with many-flowered spreading branches, the lower 1–1.5 dm. long; bracts and bractlets acute, the latter 2–3 mm. long or longer than the pedicels; calyx puberulent, cupulate, the short teeth acute, 1 mm. wide; petals white, ovate, 2.5 mm. long, puberulent, the stamens in female flowers half as long; ovary ovoid, attenuate into short style with 3-lobed stigma; ovule pendulous below the apex of the cell; drupe obliquely ovoid or subglobular, at least 8 mm. long, 5 mm. broad.—Williams noted it occasionally as tall as 20 meters, the erect columnar trunk 4 dm. or more in diameter and found it limited to the upland. Perhaps a variant of *M. heterophylla* HBK.

San Martín: Tarapoto, *Spruce 4268.* Lamas, *Williams 6408.* San Roque, *Williams 7098; 7227.* Chazuta, *Klug 4016* (det. Standley). Zepelacio, *Klug 3473.*—Junín: Near La Merced, *Weberbauer,* 282.—Huánuco: Cuchero, *Poeppig 1390, 1391,* type. Banks of Río Ysabel, Churubamba, 1,100 meters, *Mexia 8161* (det. Standley, *M. heterophylla*). Valley of the Monzón, *Weberbauer,* 284. Colombia; Dutch Guiana? "Ingaina blanca," "itil," "itil blanco," "yurac ingaina" (all Williams).

Mauria subserrata Loes. Bot. Jahrb. 37: 572. 1906.

Similar to *M. sericea;* branchlet tips merely pulverulent as the petioles, these (1.6) 2–3 cm. long; leaves sometimes 3-foliate, coriaceous, glabrous or subglabrous; leaflets entire or more or less serrulate, the lateral obtuse or subrotund at base, the others acute or subacute, all gradually narrowed to acute or obtuse acumen, (4.5) 6.5–10 cm. long, 2–4 cm. wide, the 9–14 lateral nerves and very dense reticulation only prominent beneath, the latter less so; panicles puberulent, 4–5 cm. long or in fruit to 15 cm. long, pedicels 1–2 mm. long, bracts 1–1.5 mm. long; calyx about 2 mm. wide, the lobes subacute; petals sparsely puberulent, scarcely 2 mm. long; staminodia staminiform; drupes 7 mm. long with persisting calyx at base and minutely capitate thickly 3-lobed stigma at tip.—On account of the acuminate and acute leaflets seems to be allied to *M. sericea* (Loesener). F.M. Neg. 13170.

Cuzco: Valle del Urubamba, among shrubs, mostly evergreen, 2,000 meters, Intuhuatani to Torontoi, *Weberbauer 5070* and *5077,* type.

Mauria trichothyrsa Loes. Bot. Jahrb. 37: 571. 1906.

Sulcate branchlets at tip, petioles, these 2– nearly 3 cm. long, rachises and leaf nerves beneath densely puberulent; leaves trifoliate, rarely imparipinnate, coriaceous, the ovate-lanceolate or oblong leaflets to subobovate, sessile or subsessile or terminal leaflet with petiolule to 7 mm. long, all cuneate to subobtuse at base, obtuse or rounded and shortly apiculate at tip, entire or undulate, usually 3.5–8 cm. long, rarely to 10 cm. long, 1.5–3.5 cm. wide, glabrous above, the 11–15 lateral nerves rather prominent beneath with the dense reticulation; panicles axillary, densely pubescent, 2.5–4.5 cm. long, about 1.5 cm. wide, flowers hermaphrodite, closely glomerulate, the deltoid bracts 1 mm. long; calyx 2.5–3 mm. wide; petals lanceolate-linguliform, about 3 mm. long, 1.5 mm. wide, scarcely acute; stigma lobes bilobed.—Seems to be near *M. ferruginea* Tul., which has leaves puberulent above, densely ferruginous tomentose beneath and much longer petioles (Loesener). F.M. Neg. 13172.

Cajamarca: Near Lajas, 2,500 meters, among shrubs, *Weberbauer 4218*, type.

6. SCHINUS L.

Reference: Fred Barkley, Brittonia 5: 160–198. 1944.

Trees or shrubby, with alternate simple or odd-pinnate (rarely paripinnate) leaves with sessile leaflets, these often somewhat crenate-dentate, especially toward the tips. Flowers polygamo-dioecious, bracteate, in axillary or terminal panicles or pseudo-racemes, the 5 calyx segments and oblong petals imbricate, the former rounded, the latter with the 10 stamens inserted at base of thick disk, finally reflexed; filaments subulate, anthers oval. Ovary free, sessile, 1-celled, the ovule suspended from near the apex. Style terminal, trifid or simple, with 3 minute capitellate stigmas or simple and 3-lobate. Drupes globose, small, the putamen coriaceous or osseous, usually oily.

The mulli, or more usually molle, tree is *Schinus molle* L., notable as a native plant that not only is distributed in all the drier and warm climatic areas to 3,000 meters in the south (about 2,000 meters in the north; Weberbauer) but is the popular planted tree for shade and ornament. A small example in a highly characteristic setting may be seen in an excellent photograph by Weberbauer, opposite p. 297.

Leaves simple, rarely more than 3 cm. long, usually much shorter. Inflorescences 2–3 cm. long; pubescence sparse.....*S. polygamus*.

Inflorescences 1–10 mm. long; pubescence at least on younger parts dense.....*S. microphyllus.*

Leaves at least in part, more or less divided or pinnate, rarely simple, always 4 cm. long or longer.

Leaves irregularly divided, if at all, 4–6 cm. long; branchlets erect or spreading.....*S. Pearcei.*

Leaves multipinnate, ample; branchlets lax or pendent...*S. molle.*

Schinus microphyllus Johnst. Journ. Arnold Arb. 19: 258. 1938; 178. *S. andinus* (Engl.) Johnst. Journ. Arnold Arb. 19: 259. 1938. *S. dependens* Ort. var. *andinus* Engl. in DC. Monogr. Phan. 4: 341. 1883.

Slender terminally spinose branchlets early softly puberulent pilose as the petioles, these 1–3 mm. long, and the 7–10 mm. long, few-flowered inflorescences; leaves obovate, cuneate at base, obtuse, entire or slightly serrate, 4–18 (26) mm. long, 3–10 mm. wide, typically firm-membranous; bracts broadly deltoid, puberulent and ciliate; pedicels about 3 mm. long, sparsely pilose as the lanceolate-deltoid truncate to subacute sepals; petals broadly ovate, emarginate to truncate.—Could be included in *S. polygamus* but apparently an endemic of more northern distribution. *S. andinus*, however, seems to be merely a less pubescent variant with somewhat more coriaceous leaves, at least in age, and reduced inflorescences, these 1–3 or sometimes to 6 mm. long and may become *S. microphyllus* Johnst. var. **andinus** (Engl.) Macbr., comb. nov. Type a 2-meter shrub.

Ayacucho: Tambo, Prov. de la Mar, 3,100 meters, *Weberbauer 5552* (var.).—Apurímac: Argama to Andahuaylas, 3,800 meters, *West 3747*, type; at 2,500 meters, *Weberbauer 5839*. Pincos, Prov. Andahuaylas, 2,700 meters, *Stork & Horton 10679* (det. Barkley, *S. andinus*, but intermediate).—Cuzco: Chaspyoc, Huarocando River, *Edmund Heller 2173* (var.). Ollantaytambo, *Cook & Gilbert 427* (var.). Tarapata, *Vargas 11052* (var.). Urubamba Valley, *Herrera 2104* (var.); *Weberbauer*, 175. Bolivia. "Checche" (Cook & Gilbert); "muluaca" (?, West).

Schinus molle L. Sp. Pl. 388. 1753; 184.

Abundantly but loosely leafy and gracefully branched tall shrub or tree, the slender upper branches and branchlets more or less pendent and part of the year colorful with large panicles (commonly 8–15 cm. long) of small but numerous yellowish-white flowers or in

many specimens with abundantly developed rose-red berry-like fruits that may long persist among the feathery light green foliage; leaves usually with an unequal number of pairs (often 7–13) of linear-lanceolate subentire or serrate acute or subobtuse leaflets ordinarily several cm. long, the rachis margined; flowers 5-merous with oblong petals; styles free, fruits inedible, globose, about 5 mm. in diameter.—The var. *Rusbyi* Barkley, l.c. 186, is more puberulent, leaflets 34–38, the terminal lacking and panicles 2–6 cm. long. Illustrated, Bot. Mag. *pl. 3339*.

In cultivation becomes a large picturesque tree with short but huge trunk widely over-topped by the spreading rounded crown, the loosely borne divided leaves resulting in lovely light effects, especially with a breeze, in the sun. In some Spanish-speaking lands, as in Mexico, it is called "Perú," after the country of its origin, or "pimiento (del Perú)," since when rubbed between the fingers the fruits suggest black pepper because of a volatile oil, and thus the common English name is "pepper tree." But in Peru, as noted by Weberbauer, the Quechua name "mulli" is commonly modified to "molle."

According to Herrera, in Calca the leaves are used for an "abono catalítico" called *R'ockescca* in which are sunk the seeds of maize. Ruiz and Pavón, noting that the Incas are said to have called it the "tree of life," listed a number of uses, many medicinal, including a "chicha" prepared by fermentation of the fruits with water, "sweet and agreeable to them and excellent against dropsy" and the use of the white fragrant resin as plasters for fractures and ulcers. But they warn that the seeds cannot be used for pepper without "great harm to health." The ashes, however, of the slow-burning wood give "an excellent fixed alkali for the purification of sugar and for dyes" while the trunk furnishes "excellent" lumber.

Yet in its favored natural environment among shrubs of brooks and rivers, it rarely attains timber size or, quite possibly, it is destroyed before maturity.

Cajamarca: Near Huaráz, 2,200 meters, *Weberbauer*, 172; 173. Puccha Valley, *Weberbauer*, 174. Below San Miguel, *Weberbauer*, 188. Below Santa Cruz, *Weberbauer*, 189.—Lima: Hacienda de San Jadeo and at Huacho (fide Engler). Río de Supe, *Weberbauer*, 162; 166. Native in dried-out gulches, 243.—Huánuco: Near Huánuco, *Ruiz & Pavón; Kanehira 60*.—Junín: Near Tarma, *Killip & Smith 21775; Weberbauer*, 177. Valley of the Utcubamba, *Weberbauer*, 191.—Arequipa: Yura, *Schmidt*. At 2,500 meters, (*Williams 2555* in part, type, var. *Rusbyi*). Tiabaya, rocky river bank, *Pennell*

13083. Quequeña, *Eyerdam & Beetle 22181; 22178.*—Cuzco: Urubamba, *Weberbauer,* 175; 245. Quebrado de Oropeza, *Herrera 922.* Near Ollantaytambo, *Weberbauer,* 243. Lower valley slopes and along river, Calca, *West 8076.*—Tacna: Near Tacna, *Weddell.* Bolivia; Chile; Ecuador and cultivated or perhaps native over a much wider area. "Molle," "mulli."

Schinus Pearcei Engl. Bot. Jahrb. 1: 423. 1881; 184.

Glabrous shrub or small tree with (1) 2–5 pairs, sometimes reduced to 1 leaflet, of very unequal subcoriaceous oblong obtuse but apiculate leaflets, the upper 2 or 1 and connate with the terminal, this 2–3 cm. long, the lateral 1.5–2 cm. long, 5–6 mm. wide, the leaves 4–6 cm. long, the petioles winged; panicles or racemes axillary, 4–6 cm. long, minutely puberulent as the deltoid bractlets, the pedicels 2–3 mm. long; calyx lobes scarcely 0.5 mm. long, obtuse as the longer ovate petals; anthers ovate; fruits lavender-red, about 5 mm. in diameter (Barkley).—To 6 meters tall, associated with *S. molle* to which it has great resemblance but quite distinct in habit, the branches erect (West). F.M. Neg. 35972.

Apurímac: At 2,900 meters, *Weberbauer 5853.*—Cuzco: Near Calca, 3,000 meters, *West 8075; Herrera 2080; 2089; Weberbauer,* 175. Río Chaupimayo, *Soukup 587.* Ollantaytambo, *Cook & Gilbert 773.*—Puno: *Gay,* type. Locality unknown, Orubomba, (*Pearce* in herb. Kew). Bolivia. "Molle" or "mulli" (West), "orcco-mulli" (Cook & Gilbert), "china-mulli."

Schinus polygamus (Cav.) Cabrera in Frenguelli, Inst. Mus. Univ. Nac. La Plata Obra Cinquent. 2: 269. 1937; 174. *Amyris polygama* Cav. Icon. 3: 20. *pl. 239.* 1794. *S. dependens* Ortega, Hort. Matr. Dec. 8: 102. 1798.

Shrub or small tree often gnarled or in any case the very slender glabrous or puberulent branchlets spinose; petioles only 1–3 mm. long, pilose, merging into the cuneate base of the oblanceolate to oblong or obovate obtuse or acute glabrous or rarely sparsely pilose subcoriaceous obscurely nerved leaves, these entire or more or less crenate-dentate, ordinarily 1.5–3.5 cm. long, 3–7 mm. wide; flowering branchlets little longer than foliage, puberulent or glabrescent, pseudo-racemose (2–3 cm. long), 2–3 flowers in axils of ovate minutely ciliolate bracts 1 mm. long, the almost filiform pedicels 6–8 mm. long, much longer than the globose buds; obovate-oblong petals about 3 mm. long, half as wide, nearly three times as long as the

ovate ciliolate calyx lobes and little shorter than the filiform stamens (male flowers); styles connate; drupes globose, about 4.5 mm. in diameter, with thin-chartaceous lilac lustrous exocarp, the mesocarp very resinous.—A number of variants have been designated, often as distinct species, to take care of differences largely or entirely due, probably as Engler suggests, to habitat; the Peruvian material consists only of scraps and is probably mislabeled as to origin or collectors or both. So, in a strict sense it is highly doubtful if the species occurs in Peru. Illustrated, Engler, l.c. *pl. 12, fig. 21.*

Peru(?): Without data, *Dombey; Pavón; Ruiz.* Chile; Bolivia.

7. RHUS L.

Reference: Barkley, Ann. Mo. Bot. Gard. 24: 265–498. *pls. 10–26.* 1937.

Shrub with odd-pinnate leaves (Peru) and small polygamous bracteate flowers borne in axillary or terminal, sometimes large, panicles. Calyx segments and petals 4–6, imbricate (in bud), the former persisting, the latter longer, spreading. Stamens 4–6 or 10, inserted at base of annular disk, the filaments subulate. Ovary sessile, styles 3, sometimes very short, free or connate at base, the stigma obtuse or capitate; ovule pendent from a basal funicle. Drupe slightly if at all fleshy, sometimes compressed, the seed ovoid or reniform.

Genus notable for the beneficence and infamy of its members; there is, for example, *R. vernicifera* DC. and *R. succedanea* L., both of eastern Asia, which supply lac from which lacquer, perhaps the most durable varnish, is made; and there is *R. striata* R. & P. of Peru, among others, counterpart of the poison sumac, poison oak or ivy of North America in its poisonous attributes as noted below but similar and related to the Asian species, especially to *R. succedanea.*

Rhus striata R. & P. Fl. Peruv. 3: 29. *pl. 252.* 1802; 436. *R. juglandifolia* Willd. ex Roem. & Schult. Syst. 6: 649. 1820. *Toxicodendron striatum* (R. & P.) Kuntze, Rev. Gen. 1: 153. 1891. *Rhus samo* Tul. Ann. Sci. Nat. sér. 3. 6: 367. 1846?

Tall shrub or becoming a slender trunked densely branched shapely tree 10–15 meters tall, usually nearly glabrous except for the puberulent branchlet tips and the lateral panicles that are shorter than the large leaves, these with 5–6 pairs of oblong abruptly acute

to acuminate membranous entire slender-petiolulate leaflets, often 6–12 cm. long, 4–5 cm. wide, very oblique at base, a little pilose on the nerves and midnerve beneath, the veins obscure; sepals rounded, 1 mm. wide, glabrous; petals white, 2.5 mm. long; drupes whitish, about 8 mm. in diameter, the seed 5 mm. long, 7 mm. broad.—*R. juglandifolia* var. *samo* (Tul.) Engl., branchlets as leaves beneath ferruginous pubescent, the fruit ex icone a little larger, seems as to Peru to be the type. F.M. Neg. 13190 (*R. juglandifolia* Willd.).

There is a well-grounded belief among the country people that one taking even a siesta in the shade of this small tree will suffer the often agonizing torment of the skin poisoning "mayco" to which many are susceptible; actually, as shown by McNair (at least for northern species) and others, contact with the sap is necessary but may occur indirectly from touching clothing already brushed against the tender foliage or flowers or from fallen parts of the plant. Ruiz and Pavón in their Journal, English ed., Field Mus. Bot. 21: 80 and 95. 1940, recorded their own experience and the native superstition which I found persisting a century and a quarter later. A modern and effective preventative and treatment for relief according to James B. McNair, Am. Biol. Teacher, 2: 100–101. 1940, or Field Mus. Leaflet 12: 10–12. 1926, both from the same author's "Rhus dermatitis," Univ. of Chicago Press, Illinois, is application of 5 per cent iron chloride in a half and half mixture of alcohol and water, applied freely. In the United States immunity for some time is often acquired from poisoning (by similar species) by the use of a diluted and purified rhus toxin (.0130 gm. in 13 cc. ethyl alcohol) as prepared by chemical laboratories.

Amazonas: Chachapoyas, *Mathews.*—San Martín: Near Moyobamba, Weberbauer, 291.—Huánuco: Chinchao to Macora, *Ruiz & Pavón.* Yanano, *3787.*—Junín: Chanchamayo Valley, *Weberbauer.* Below Huacapistana, *Sandeman 4571.*—Cuzco: Valle de Santa Ana, Hacienda Idma, Weberbauer, 281. Valle de Santa Ana, 1,000 meters, *Herrera 3483.* Río Apurímac, 1,100 meters, *Weberbauer 5889.* Río Chaupinmayo, *Soukup 805.* To southern Mexico. "Mayco," "incati" (Cuzco), "itil" (San Martín).

8. LOXOPTERYGIUM Hook. f.

Trees with 2–4 pairs of large odd-pinnate leaves, the opposite petiolulate leaflets usually crenate, the small polygamo-dioecious flowers crowded in branched panicles. Calyx lobes obtuse, 5,

imbricate as the incurved petals. Stamens 5, inserted outside the disk base, the distinctly dorsifixed anthers on filiform-subulate filaments. Ovary 1-celled with solitary compressed ovule pendulous from ascending basal funicle. Styles connate or short or obsolete, the often more or less medially lateral stigmas sessile on the lightly falcate samara, the oblique obtuse wing-portion membranous, nervose. Seed testa membranous, embryo curved.

Loxopterygium huasango Spruce ex Engl. in DC. Monogr. Phan. 4: 461. 1883.

Younger branches, petioles and panicles pilose with short and long trichomes intermixed, the 4–5 pairs of oblong subacute subsessile leaflets white-hirsute on the midnerve and nerves beneath, otherwise glabrous, the lower 6 cm. long, half as wide, the intermediate 6–8 cm. long; panicles about 1 dm. long, the secondary branchlets 3–5 cm. long, pedicels 1–3 mm. long; calyx segments ovate, shortly pilose, the oblong petals about four times longer or 2 mm. long; filaments nearly 3 mm. long; samara 1.5 cm. long, 5–6 mm. broad, the lower part including the seed 6 mm. long.—Tree 8–10 meters tall, the wood hard. Illustrated, Weberbauer, 151; Svenson, Amer. Journ. Bot. 33: 400 (branch). F.M. Neg. 13184.

The bark and leaves have a resin which affects the skin much as in *Rhus* (Svenson).

Piura: Quebrada Ancha near La Brea, (*Haught & Svenson 11558*). Above Payta, Weberbauer, 153. Ecuador. "Huasango."

9. SCHINOPSIS Engler

Younger branchlets puberulent, glabrous and blackish in age, the leaves either odd- or even-pinnate, the common petiole narrowly winged, the leaflets many pairs, small, entire. Flowers polygamous, the ovate sepals definitely imbricate, the 5 oblong-elliptic petals with prominent midnerve within, concave, spreading-reflexed. Disk thickish, the short filaments inserted in each sinus of the 5 lobes. Ovary rudimentary in male flowers, ovoid and strongly compressed in female, the sessile stigma lateral, the pendulous ovule conforming to the single cell. Calyx persisting at base of cultriform samara, the endocarp osseous.—Embryo curved as in the similar *Loxopterygium*.

Schinopsis peruviana Engl. in Mart. Fl. Bras. 12, pt. 2: 405. *pl. 86*. 1876; 462.

Densely leafy branchlet tips, petioles and leaves beneath more or less conspicuously pilose, the leaves 1–1.5 dm. long with as many as 15 pairs of spreading opposite oblong sessile obtusish inequilateral but subequal leaflets, the median longer, about 1.5–2 cm. long, 4–5 mm. wide; panicles 1.5 dm. long, the secondary branches spreading, the subsessile flowers crowded apically, with semiovate bracts scarcely 1 mm. long; sepals ovate, obtuse, pilose at base, marginally ciliolate, 0.7 mm. long; petals oblong-ovate, 2 mm. long, half as wide, subequaled by the stamens; thick wings of fruit thin-edged, medially 1 cm. wide, 2 cm. long, 5 mm. wide at obtuse tip.—Cf. also *S. Haenkeana* Engl. l.c. Illustrated, Engl. l.c. *pl. 15, figs. 6–7.*

San Martín: Near Tarapoto, *Spruce 4549*, type; *Williams 5727.* "Baloquiro," "cocobolo."

10. HAPLORHUS Engler

Simple-leaved shrub or tree with slender branchlets, the short axillary floriferous composite-paniculate with secondary or tertiary flexuose racemose divisions. Flowers (male unknown) sessile in axils of obovate bracts subtending the 5 imbricate sepals. Ovary obovoid, laterally compressed, 1-celled, the solitary ovule pendent from a basal funicle. Stigmas 3, sessile, minute, triangularly placed laterally below the apex. Drupes obliquely obovoid, compressed laterally, exocarp and mesocarp thin, endocarp coriaceous, the seed with thin testa.

Haplorhus peruviana Engl. Bot. Jahrb. 1: 419. 1881; 283.

Glabrous (unless panicles) the sparsely leafy slender glaucescent branches with internodes about 1 cm. long; leaves linear-lanceolate, narrowed to the scarcely petioled base, coriaceous, the lateral nerves immersed, 5–9 cm. long, 5–10 mm. wide; panicles obscurely puberulent, 2–3 cm. long; pedicels 0.5 mm. long; bracts ciliate, nearly 1 mm. long; drupes 3.5 mm. long, 3 mm. thick.—Wide crowned-tree to 15 meters tall with short irregular trunk, dark brown fissured bark, with *Schinus molle* dominant in Mantaro Valley for some 50 kilometers below La Mejorada, most plentiful on canyon floor but extending up the slopes singly or in groups to about 500 meters; collected by Dr. O. Usandivaruas of Andahuaylas (West). Illustrated, Engler, l.c. *pl. 9.*

Huancavelica: Rocky canyon slopes, La Mejorada to Mayoc, 3,000 meters, *West 8354* (det. Johnston).—Puno: *Gay*, type.

CELASTRACEAE. Bittersweet Family

Reference: Loesener, Pflanzenfamilien ed. 2. 20b: 87–197. 1942.

Trees or shrubs, sometimes scandent, the simple leaves alternate or opposite, the stipules, if present, small and caducous. Flowers small, cymose or fasciculate, often perfect, the 4–5 calyx lobes as the 5 petals imbricate or rarely valvate, the latter alternate with the 4–5 stamens (these exceptionally more) and inserted on the ordinarily flat and fleshy disk or this rarely obsolete. Anthers 2-celled, longitudinally dehiscent. Ovary superior, free or adherent, 1–5-celled, the short style more or less 3-lobed; ovules mostly 2 from the inner angle of each cell. Fruit various but seeds mostly with abundant endosperm and rather large straight embryo, the flat cotyledons thin.—Often said to be distinguishable from Aquifoliaceae by the presence of the disk and the usually capsular dehiscent fruit but these characters are not in themselves definitive for two Peruvian genera, as noted below. The genus *Alzatea* R. & P. formerly included here will be placed for convenience in this work in the Rhamnaceae. Cf. Loesener, l.c. 196. The genus *Cheiloclinium* Miers, transferred by Loesener, l.c. 17, here from the similar Hippocrateaceae, is retained for expediency in that family.

Fruit dehiscent; seeds arillate; ovules usually 2; disk present, undulate; leaves entire unless above middle; flowers axillary. 1. *Maytenus.*

Fruit drupaceous, sometimes coriaceous; ovules solitary; disk obsolete or 4–5-lobed; leaves serrate if flowers axillary (Peru).

Inflorescences fasciculate, forked; leaves entire or nearly. 2. *Rhacoma.*

Inflorescences simple (known); leaves serrate (Peru). 3. *Schaefferia.*

1. MAYTENUS Feuillée

Usually glabrous or essentially glabrous shrubs or small trees with persisting coriaceous often distichous alternate petioled leaves, the minute stipules deciduous, and small polygamous axillary white or yellowish flowers. Calyx 5-parted, the petals spreading. Stamens 5 (filaments subulate, anthers ovate-cordate), inserted below the orbicular undulate-margined disk in which the 2–4-celled ovary is immersed and confluent; ovules solitary or geminate, erect. Style none or short, the stigma 2–4-lobate. Fruit capsular, coriaceous, 1–3-celled, loculicidally 2–3-valvate, the seed arillate.

It has not been practical for me to attempt evaluation of the many species proposed in this group; the key is only suggestive and some of the characters indicated for reasons of expediency will prove, it seems to me, to be less significant when a comprehensive study is possible. Cf. *Rhacoma* for *M. magnifolia* Loes. Verh. Bot. Ver. Brandenb. 48: 176. 1907.

Leaves all or many distinctly shorter than 3 cm.
  Leaves more or less oblanceolate, cuneate to base.
    Leaf-nerves obsolete above.....*M. andicola.*
    Leaf-nerves and usually the veins obvious above.
      Leaves a cm. wide or narrower.....*M. cuzcoina.*
      Leaves, at least some of them, wider.....*M. apurimacensis.*
  Leaves more or less obovate or suborbicular, at least in Peru, rounded to acute at base.
    Leaves about half as wide as long.
      Inflorescences simple.....*M. conferta.*
      Inflorescences peduncled.....*M. boarioides.*
    Leaves more than half as wide as long.....*M. octogona.*
Leaves all or many 3 cm. long or longer.
  Leaves obviously if minutely serrate, at least toward the tip.
    Leaves more or less oblong-lanceolate, often about half as wide as long or even narrower.
      Nerves obsolete (Peru); leaves coriaceous....*M. alaternoides.*
      Nerves more or less obvious.
        Leaves coriaceous; veins obscure.
          M. pseudoboaria, M. Pavonii, M. verticillata.
        Leaves membranous with reticulate venation both sides.
          M. Jelskii.
    Leaves more or less elliptic or more than half as wide as long.
      Leaves conspicuously acuminate.....*M. Krukovii.*
      Leaves shortly if at all acuminate, often obtuse or emarginate.
        M. durifolia, M. retusa.
  Leaves quite or essentially entire, even at tip.
    M. tarapotensis, M. macrocarpa.

Maytenus alaternoides Reiss. in Mart. Fl. Bras. 11, pt. 1: 15. 1861.

Glabrous; branchlets terete, many; petioles 4 mm. long, submargined by the decurrent blade, this 3.5–7 or 8 cm. long, 2–3 cm.

wide, oblong or narrowly lanceolate and acuminate or elliptic and cuspidate, crenate-dentate nearly to base, the 8–15 nerves both sides or beneath prominent or obsolete, often drying brownish above, early glaucous, finally coriaceous; cymes 2–3 times longer than petioles, fasciculate or branched; basal bractlets of filiform pedicels deltoid, stipuliform; flowers 3–4 mm. wide; calyx segments rounded, half as long as the oval or obovate petals; disk fleshy, subpentagonous; filaments subulate, anthers subcordate; fruiting pedicels 4 mm. long; style very short, stigma entire; capsules obovoid or subglobose, subligneous, 16–18 mm. long, the solitary ellipsoid compressed brown lustrous seed 8–10 mm. long, the aril drying crustaceous (after Reissek).—Var. *peruana* Loes., Bot. Jahrb. 37: 574. 1906, has the leaf nerves fainter above. Illustrated, Reissek, l.c. *pl. 2, fig. 12* (leaves). F.M. Neg. 13270.

Cuzco: Prov. de la Convención, Valle del Urubamba, *Weberbauer 5066* (type, var.); 245. Central Brazil.

Maytenus andicola Loes. Bot. Jahrb. 50: Beibl. 111: 9. 1913.

Branchlets spreading, the older subterete, at the third year about 2 mm. thick, the young shoots pulverulent-papillose, sometimes obsoletely; leaves crowded, the internodes 4–9 mm. long; petioles 1–3 mm. long; leaves lanceolate or elliptic-lanceolate to obovate-elliptic, acute or narrowly cuneate at base, rounded or obtuse to acute at tip, this mostly very minutely apiculate, 1–2.6 cm. long, 4–8 mm. wide, entire or rarely obsoletely and remotely appressed serrulate, rigid-coriaceous, the 3–4 pairs of lateral nerves more or less arcuate to tips, obsolete or faint above, sometimes rather marked beneath, not reticulate; pedicels under anthesis scarcely 1 mm. long and flowers then hardly 2 mm. wide, the former in fruit barely 2 mm. long, glabrous; calyx glabrous, except the fimbriolate-ciliolate suborbicular lobes; petals irregularly orbicular, margins glandular(?)-fimbriolate, about 1 mm. broad; anthers cordiform; ovary 2-celled, stigma bilobed; capsules ellipsoid, 7–8 mm. long, 4–6 mm. wide, by abortion 1-celled, tardily dehiscent, 1-seeded, the seed invested by the flat aril.—Affine *M. viscifolia* Griseb. of Argentina, with larger thicker leaves, larger flowers, ovary 3-celled (Loesener). Aspect of *M. cuzcoina* and with it near probably *M. conferta.*

Ancash: Closely branched shrub, Huaráz, *2525* (det. in herb., *M. conferta*).—Ayacucho: Near Ayacucho in rocky shrubby outcrops, 3,000 meters, *Weberbauer 5507*, type.

Maytenus apurimacensis Loes. Bot. Jahrb. 50: Beibl. 111: 9. 1913.

Branchlets erect-spreading, finally terete and densely lenticellate, by the second or third year to 5 mm. thick, the new shoots striate-angulate, closely pulverulent-papillose, scarcely to 2 mm. thick; leaf internodes 5–8 mm. long; petioles hardly 1 or to 2 mm. long; leaves obovate- or rarely ovate-elliptic, acute or sometimes cuneate at base, obtuse or mostly rounded at apex where often minutely apiculate, 1–3.2 cm. long, 4–19 mm. wide, the margin densely but frequently obsoletely serrulate (under a lens), rigid-coriaceous, nitidulous and very minutely closely punctulate both sides, lateral nerves 4–6 pairs, equally prominent above and below, reticulation faint or obsolete; flowers few, densely fascicled, under anthesis scarcely 2 mm. wide, the glabrous pedicels 1.5(–2) mm. long; calyx glabrous except the ciliate obtuse lobes, these 0.75 mm. long; petals suborbicular, about 1.5 mm. wide; anthers subreniform, broader than long; stigma capitellate.—Said to attain 2 meters. Affine *M. cuzcoina* Loes., perhaps a variant, but larger leaves broader, rounded at tip and nerves more manifest (Loesener). The var. *Trollii* Loes., Notizbl. Bot. Gart. Berlin 13: 219. 1936, has slightly narrower or narrowly elliptic and thinner leaves. F.M. Neg. 13268.

Apurímac: Between Río Pachachaca and Río Pampas, 2,400 meters, *Weberbauer 5873*, type.—Cuzco: Yucay, Valle del Urubamba, *Herrera 2556* (var. *Trollii*). Bolivia. "Paltai-paltai" (Herrera).

Maytenus boarioides Loes. Bot. Jahrb. 36: 381. 1905.

Glabrous, the lightly striate shoots 1–1.5 mm. thick; petioles 2–4 mm. long; leaves typically oblong or lanceolate-oblong, cuneate (in Peru merely acute) at base, acute or obtuse and minutely apiculate, 2–2.5 cm. long, 9–12 mm. wide, coriaceous, above slightly lustrous, the acute midnerve prominent, the 4–7 slender lateral nerves obsolete, these rather prominent beneath and reticulate especially toward the serrulate margins; inflorescences solitary in axils, only about 1 mm. long, peduncled, bifurcate, many-flowered, pedicels 2–3 mm. long, bracts deltoid, sparsely fimbriolate, scarcely 1 mm. long; flowers under anthesis about 3 mm. wide; sepals rotund, fimbriolate, less than half as long as the subrhombic-ovate petals; stamens inserted without and within the subpulvinate obsoletely lobed disk; ovary costate, scarcely semi-immersed, 2-celled, ovules solitary, stigma capitate, 4-sulcate; capsule bivalved, the valves 6–7 mm. long, arillate base nearly to middle.—Much like *M. boaria*

Molin. but that species with less densely serrulate, more obtuse leaves (Loesener). The peduncled inflorescences separate it from *M. cuzcoina* and *M. apurimacensis*. F.M. Neg. 13273.

Huánuco: Yanahuara Valley, Huanta, *Weberbauer 7600; 7599*. Ecuador.

Maytenus conferta (R. & P.) Reiss. & Loes. in Pflanzenfam. 3, Abt. 5: 206. 1892. *Celastrus confertus* R. & P. Fl. Peruv. 3: 7. 1802.

Much-branched, the crowded verticillate branchlets as the short petioles lightly pubescent; leaves black-serrulate above the middle, to mucronate tip, oval or subrotund or often ovate-oblong (at least about 10 mm. long, half as wide), coriaceous, lustrous above, venose; pedicels many, short, the solitary whitish flowers minute; capsules 2–3-celled and with as many valves and seeds, the latter obovoid with fleshy yellowish aril.—Pedicels according to Briquet scarcely as long as flowers. *M. Jamesonii* Briq. Ann. Cons. Jard. Bot. Genève 20: 353. 1919, of Ecuador is similar with nerves prominently reticulate beneath but the branchlets are glabrous, flowers larger, the ovate-triangular petals about 1 mm. long (Briquet). F.M. Neg. 13280.

Huánuco: In cold woods toward Muña and Pillao, *Ruiz & Pavón*, type. Monzón, *Weberbauer 3385* (det. Loesener); 253.—San Martín: Vitoc, *Ruiz & Pavón*.

Maytenus cuzcoina Loes. Bot. Jahrb. 37: 574. 1906.

Branchlets terete, the grayish bark densely lenticellate and longitudinally rimulate, the slender tips under a lens most minutely pulverulent-papillose; petioles about 1 mm. long; leaves about oblanceolate, above the middle broader, subentire or obsoletely and appressed serrulate, narrowly acute to base, rounded, obtuse or subacute at tip, only under a lens apiculate, 12–25 mm. long, 3.5–7 mm. wide, coriaceous, concolorous, lateral nerves few, obvious above, prominent or obsolete beneath, the reticulation inconspicuous; flowers 5-merous, fasciculate in the leaf-axils, greenish, the glabrous pedicels about 1 mm. long; sepals rotund, under lens denticulate-subciliate, scarcely 0.5 mm. long and wide; petals broadly ovate-suborbicular, little oblique, about or hardly 1.5 mm. long, 1 mm. wide; stamens inserted in fleshy pentagonally angled disk, subequaling sepals, subreniform anthers scarcely as long as subulate filaments; ovary conical (stigma capitate, obsolete or slightly bilobulate),

2-celled, cells biovulate, ovules erect.—*M. boaria* Molin. has the leaves more narrowed to the tip (Loesener). F.M. Neg. 23248.

Ancash: Openly branched canyon shrub, Llata, *2290* (det. in herb. *M. conferta*).—Ayacucho: Tambo, *Weberbauer 5553* (det. Loesener).—Cuzco: Valle del Urubamba, 3,200 meters, in open thicket along brook, *Weberbauer 4915*, type. Río Chaupimayo, *Soukup 595* (det. in herb. *M. andicola*). Ollantaytambo, *Cook & Gilbert 418* (det. in herb. *M. conferta*). "Paltay-paltay" (Cook & Gilbert).

Maytenus durifolia Briq. Ann. Cons. Jard. Bot. Genève 20: 351. 1919.

Glabrous except the ciliate bracts; branchlets subterete; petioles to 5 mm. long; leaves nearly elliptic, acute at base, contracted to obtusish tip, 3–4 cm. long, 2–2.7 cm. wide, coriaceous, slightly lustrous and obsoletely venose above, paler beneath, the 6–8 lateral nerves there very fine; flowers fasciculate from a pulvinus of crowded apiculate bracts; pedicels to 3 mm. long; sepals ovate, fimbriate, to 0.6 mm. long; petals oblong-ovate, rounded at tip, subfimbriate, to 1.2 mm. long, 1 mm. wide; disk about 1.2 mm. wide.—Allied to *M. retusa* (Poir.) Briq. as determined in herbaria but easily distinguished by leaves obtuse both ends, fewer nerves, shorter pedicels (Briquet). F.M. Neg. 23249.

Peru(?): Without locality, *Ruiz & Pavón*, type.

Maytenus Jelskii Zahlbr. in Szyszyl. Diag. Pl. Nov. 1: 8. 1895 (Dissert. Classis Math. Phys. Acad. Litt. Cracov. 29: 222. 1895). *M. Mathewsii* Briq. Ann. Cons. Jard. Bot. Genève 20: 348. 1919.

Branchlets slender, subangled, minutely puberulent; petioles a little puberulent, 2–3 mm. long; leaves oblong-lanceolate, acute both ends or the lower obtuse, broadest above the middle, 2.5–4.5 cm. long, 1–18 mm. wide, green, paler beneath, glabrous, finely dentate toward the apex, lateral nerves 10–12, prominently reticulate both sides; inflorescence solitary, axillary, peduncles 5–7 mm. long, densely spreading-puberulent, the 3–4 mm. long pedicels glabrescent; bracts ciliolate; flowers 4–5 mm. wide; sepals oblong, rounded, about 0.6 mm. long; petals to 1.8 mm. long; disk nearly 1 mm. broad (after Briquet).—Marked by the membranous leaves with fine delicate venation both sides and by the puberulence (Briquet). F.M. Neg. 23257 (*M. Mathewsii*).

Cajamarca: Cutervo, *Raimondi* (det. Loesener); *Jelski*, type.—Amazonas: Chachapoyas, *Mathews* (type, *M. Mathewsii*).—Cuzco: Pumahuanca, 3,500 meters, *Vargas 7692?*

Maytenus Krukovii A. C. Smith, Journ. Arnold Arb. 20: 294. 1939. *M. chuchuhuasha* Raymond-Hamet & Colas, Compt. Rend. Acad. Sci. Paris, 1886. 1937; (Dissert. Faculté de Pharmacie, Paris, 1937)?

Glabrous tree to 28 meters tall, the slender branchlets terete; petioles nearly alate or conspicuously canaliculate, 6–9 mm. long; leaves oblong-elliptic or obovate-elliptic, 9–14 (18) cm. long, 3.5–5 (7) cm. wide, attenuate to base, acuminate (acumen about 1 cm. long), obscurely crenulate-serrulate, coriaceous, the 7–9 lateral nerves immersed above and obscure, lightly prominent beneath; inflorescences axillary, glomerulate, 4–5 mm. across; flowers sessile or pedicels 0.5 mm. long, 50 or more to an inflorescence; sepals deltoid, 0.8–1 mm. long, minutely glandular fimbriolate, subacute; petals oblong-deltoid, 0.8–1.2 mm. long, obtuse or rounded; disk fleshy, undulate; style 0.4 mm. long; capsules coriaceous, 2 cm. long, 14 mm. wide, bivalved. —*M. ebeniifolia* Reiss. of Brazil and *M. Karstenii* Reiss. of Colombia apparently resemble this in foliage but both have pedicellate flowers, those of the latter in fascicles. *M. micrantha* A. C. Smith, l.c., 295, has smaller thinner leaves with spreading lateral nerves obvious on both sides.

Probably this is *M. chuchuhuasha* as suggested by the collector but that was described in rather running comment and in French; while it would be appropriate for the scientific and native names to coincide, and convenient, it is better in the interest of uniformity to accept the equally well-chosen name used when the plant was described, in conformity with modern custom, in Latin and with formal typification.

According to P. Le Cointe, Arvores e Plantes Uteis 120. 1934, the bark yields an alkaloid which is a powerful stimulant similar to cathin from the leaves of *Catha edulis* Forsk.

Peru: Apparently the type of *M. chuchuhuasha;* see note above. Brazil. "Chuchuhuasca," "chuchuhuasha."

Maytenus macrocarpa (R. & P.) Briq. Ann. Cons. Jard. Bot. Genève 20: 361. 1919. *M. multiflora* (R. & P.) Loes. Bot. Jahrb. 36: 380. 1905, not Reiss. *Haenkea multiflora* R. & P. Syst. Veg. 65. 1798. *Celastrus macrocarpus* R. & P. Fl. Peruv. 3: 8. *pl. 230.* 1802.

Haenkea macrocarpa (R. & P.) Steud. Nomencl. ed. 1: 170 and 387. 1821.

Glabrous with verticillate branches, the leafy branchlets angulate; petioles to 4 mm. long; leaves oblong-lanceolate or elliptic, entire, acuminate but emarginate, coriaceous, lustrous above, 1–2 dm. long; flowers 5-merous, minute, many in the axils; calyx colored, the teeth deciduous; petals obovate, whitish, spreading; styles mostly simple; capsules obovoid, often 1-seeded, 2–3-valved, the oblong seeds with white aril.—F.M. Neg. 13298.

Huánuco: Muña and Chacahuasi, *Ruiz & Pavón*, type.—San Martín: Zepelacio, *Klug 3721*. Ecuador.

Maytenus octogona (L'Hér.) DC. Prodr. 2: 9. 1825. *Celastrus octogonus* L'Hér. Sert. Angl. 7. 1788. *Ziziphus peruviana* Lam. Encycl. 3: 320. 1789. *Maytenus obovata* Hook. f. Trans. Linn. Soc. 20: 230. 1847, fide Svenson. *Celastrus orbicularis* Willd. ex Roem. & Schult. Syst. 5: 423. 1819. *Maytenus uliginosa* HBK. Nov. Gen. & Sp. 7: 65. 1824. *M. orbicularis* (Willd.) Loes. Bot. Jahrb. 50: Beibl. 111: 10. 1913.

Sprawling to erect shrubs often 3 meters tall with glabrous or minutely pubescent branchlets and with fleshy leaves varying from ovate to suborbicular or obovate, these commonly 1–2 cm. long, 7–12 mm. wide, the margins entire to repand dentate; petioles about 2 mm. long; pedicels 2–3, axillary, fasciculate, usually bracteate, 2–3.5 mm. long, glabrous or pubescent as the calyces; capsules ovoid, obtusely trigonous, usually 3(2–4)-celled, thick- or thin-walled, about 7 mm. wide and long.—In part after Svenson, Amer. Journ. Bot. 33: 461. 1946. Illustrated, Svenson, l.c. p. 462. F.M. Neg. 35918.

Tumbez: Cancas, *Weberbauer 7754*.—Piura: Talara, *Haught 58; 76* (det. Svenson). Paita, *Haught 97; Gaudichaud*. Río de Lomas, 700 meters, *Weberbauer 5740*. La Brea, (*Haught & Svenson 11573*).—Ica: Above Pisco, near Santa Ines Mine, 4,600 meters, *Weberbauer 5381* (det. Loesener, leaves narrower and thicker).—Ancash: River valley gravel, *2565*.—Tacna: Near Tacna, *Rusby 2618*. Chile; Ecuador; Galapagos. "Realingo" (Weberbauer).

Maytenus Pavonii Briq. Ann. Cons. Jard. Bot. Genève 20: 349. 1919.

Glabrous or nearly, the rather stout branchlets angled, the petioles 1–2 mm. long; leaves narrowly lanceolate-oblong, minutely dentate above the cuneate base, acute or subacute, 2–4 cm. long, 7–10 mm.

wide, coriaceous, lustrous above, the few indistinctly pinnate lateral nerves sub-immersed; peduncles rarely to 5 mm. long, pedicels to 3 mm. long; bracts obscurely ciliolate; sepals to 0.6 mm. long; petals obovate, fimbriolate, 1 mm. long; disk nearly 1 mm. wide.—Easily distinguished from *M. verticillata* by the smaller indistinctly crenate-dentate leaves, less apparent venation, few-flowered inflorescence, smaller flowers and fimbriolate petals (Briquet). F.M. Neg. 23259.

Peru(?): Without data, *Pavón*, type.

Maytenus pseudoboaria Loes. Notizbl. Bot. Gart. Berlin 12: 29. 1934.

Glabrous shrub with spreading or erect branchlets, the older densely lenticellate, the younger sulcate-striate; petioles 2–5 mm. long; leaves lanceolate or oblanceolate, rarely suboblong or obovate-elliptic, cuneate or acute at entire base, densely serrulate to tip, obtuse or subacute, 2.5–5 cm. long, 8–17 mm. wide, coriaceous or chartaceous, the 5–7 lateral nerves rather prominent both sides, the reticulation only so beneath; inflorescences solitary or lateral or in the axils and 1- or 1–3-flowered, the peduncles of the latter 3–6 mm. long, the pedicels of the 1-flowered 4–7 mm. long, of the 2–3-flowered to 4 mm. long and minutely bracteolate; flowers in bud (type), sepals rounded; capsules 3-celled, 2–3-valved, the valves 5 mm. long and wide; seed ellipsoid, 4 mm. long, more or less arillate.—The description includes the var. *triantha* Loes. and the var. *monantha* Loes., the species according to the author much like both *M. boaria* Molin. of Chile, with more coarsely serrate and acute leaves, flowers mostly fascicled in the axils, and *M. boarioides* Loes., with more oblong shorter leaves, 2-celled ovary and capsule; also *M. Pavonii* Briq. ex char. seems to be approximate but the smaller leaves are said to be denticulate-crenate, the lateral nerves sub-immersed above. The name was originally spelled as above and without hyphen. F.M. Neg. 29280 (var. *triantha*).

Huánuco: Macora, *Ruiz & Pavón* (type, var. *triantha*). Bolivia.

Maytenus retusa (Poir.) Briq. Ann. Cons. Jard. Bot. Genève 20: 351. 1919. *Celastrus retusus* Poir. Encyl. Suppl. 2: 146. 1811. *C. emarginatus* R. & P. Fl. Peruv. 3: 6. *pl. 229*. 1802, not Willd.

Glabrous unarmed shrub, the erect little leafy stems with a few slender angulate branchlets; petioles 4 mm. long, canaliculate above; leaves ovate-oblong-elliptic, acuminate but emarginate at tip, slightly crenate, coriaceous, venose both sides, lustrous above;

peduncles congested in the axils, 1-flowered, unequally elongate; petals yellow, spreading; stigma often entire or bifid or trifid; capsules obovoid, yellow, 1–3-celled (Ruiz & Pavón).—Allied to *M. conferta* (R. & P.) Briq. but leaves much larger, obtuse or emarginate, not apiculate, rounded at base, lateral nerves more numerous, petioles to 5 mm. long, flowers larger on elongate pedicels (Briquet). F.M. Negs. 13286; 23267.

Huánuco: Near Muña, *Ruiz & Pavón*, type.

Maytenus tarapotensis Briq. Ann. Cons. Jard. Bot. Genève 20: 264. 1919.

Glabrous, except the ciliate bracts of the pulvinus of the axillary congested flowers; petioles 5–8 mm. long, sulcate above; leaves oblong or lanceolate, cuneate at base and somewhat narrowed to obtuse tip, entire, to 8 cm. long, 2.8–3.7 cm. wide, coriaceous, the 8 lateral nerves immersed on upper lustrous surface, subimmersed on opaque not at all papillose under side; pedicels to 3 mm. long; sepals ovate, scarcely longer than 0.5 mm.; petals obovate, rounded, about 1 mm. long, 0.8 mm. wide; disk about 0.7 mm. wide.—Allied to *M. ligustrina* Reiss. of Brazil but remarkable by the conspicuously immersed nerves (Briquet); but the type was referred by Loesener to *M. macrocarpa*. F.M. Neg. 23022.

San Martín: Campaña near Tarapoto, *Spruce 4329*, type.

Maytenus verticillata (R. & P.) DC. Prodr. 2: 10. 1825. *Celastrus verticillatus* R. & P. Fl. Peruv. 3: 6. *pl. 229*. 1802.

Stems terete, nigrescent; branches aggregate-verticillate, virgate, erect, the younger angled, leafy, often purplish as the short petioles; leaves crowded, often glaucous, oblong-lanceolate or oblong-obovate, serrulate, lustrous both sides, venose beneath, coriaceous, to 1 dm. long; peduncles solitary and aggregate, 1–5-flowered, the pedicels short; calyx segments rounded, half as long as the ovate spreading petals; disk plane; style obsolete, stigmas 3; capsules 3-celled, 3-valved, the solitary seed with aril (Ruiz & Pavón). Flowers greenish-white; seeds orange-yellow. To 8 meters tall.—The var. *latifolia* Loes., Bot. Jahrb. 36: 381. 1905, of Ecuador has leaves to 8.5 cm. long, 3–5 cm. wide, capsules to 6 mm. in diameter; var. *Lehmannii* Loes., Rep. Nov. Sp. 1: 161. 1905, from near Cuenca recedes from the type in its less densely serrulate leaves, obviously long-ciliate sepals and smaller 2-merous ovary. F.M. Neg. 13326.

The strong wood is very suitable for handles of axes and other tools (Ruiz & Pavón).

Huánuco: Mito, *1478; 1947; 3418.* Cani, *3456; 3479.* Muña, *4059;* Macora and Muña, *Ruiz & Pavón,* type. Yanano, compact 3-meter tree, *3762* (?leaves thinner).—Junín: Huasahuasi, *Ruiz & Pavón,* type (part). Near Palca, *Weberbauer 1768; 2181;* 246.—Ayacucho: Aína, 8-meter tree, *Killip & Smith 22517; 23139.*—Apurímac: Río Pinco, 3,200 meters, *Weberbauer 5912; 5914.*—Cuzco: Valle de Santa Ana, about 2,000 meters, *Weberbauer 5914.* Valle del Paucartambo, 3,400 meters, *Herrera 2961.* Bolivia? Chile? "Pilpus," "duraznillo" (Herrera), "rurama" and "picma" or "pigna" (Ruiz & Pavón).

2. RHACOMA L.

Glabrous or pubescent with mostly opposite (in Peru alternate) sometimes crenate leaves, the stipules small, and inconspicuous flowers cymose or subsolitary at the ends of short or long peduncles. Calyx urceolate-patelliform with 4–5 rounded lobes, the 4–5 petals reflexed. Stamens 5, inserted between the lobes of the nearly plane disk, the filaments subulate, the anthers subglobose. Ovary confluent with disk, usually 3–4-celled, the very short style with 3–4-lobate or punctiform stigmas; ovules erect, solitary in each cell. Fruit dry or fleshy, coriaceous or drupaceous, most often 1-celled, the erect seeds without an aril.—The alternate-leaved species are probably better referred to *Maytenus* (Bentham & Hooker). Indeed *M. magnifolia* Loes. Verh. Bot. Ver. Brandenb. 48: 176. 1907, in fruit and not placed by me, might be sought here.

Rhacoma Urbaniana Loes. Repert. Nov. Sp. 1: 162. 1905.

Glabrous, the subterete shoots 1–2 mm. thick, the older branchlets twice as stout and plicate-striate; petioles 5–10 mm. long; leaves alternate, oblong-lanceolate, cuneate at base, mostly long-acuminate or acute, entire or the younger minutely and sparsely callous-denticulate (under lens), 13–21 cm. long, 3.5–5.5 cm. wide, chartaceous, with 7–9 lateral nerves arcuate at tip, rather prominent both sides, the reticulation lax and obsolete; inflorescences fasciculate in the axils, usually to 4-furcate, the peduncles 2–10 mm. long; bracts obtuse, 0.5 mm. long; pedicels 2.5–5 mm. long; flowers 4-merous; calyx patelliform, the rounded lobes scarcely 0.5 mm. long, about 0.75 mm. wide; petals imbricate, nearly 2 mm. long, 0.75 mm. wide, the stamens half as long; disk inconspicuous; ovary 4-celled, sub-

lageniform, stigma punctiform.—About 4 meters tall; nearest the smaller-leaved *R. spathulifolia* Urban of Cuba according to the author. F.M. Neg. 13332.

Junín: In open woods near La Merced, 1,000 meters, *Weberbauer 1875*, type; 282.

3. SCHAEFFERIA Jacq.

Rigid shrubs with alternate coriaceous usually entire (in Peru serrate) leaves with small pedicellate or sessile dioecious 4-merous flowers in their axils. Sepals orbicular. Petals oblong-elliptic, obtuse. Disk small or none. Ovary sessile, the erect ovules solitary in the 2 cells. Drupes with 2 pyrenes, the erect seed without aril. —Near *Rhacoma* but unique because of the reduced disk; in the male flowers it approaches Aquifoliaceae (Loesener). The name commemorates Jakob Christian Schaeffer (1718–1790), author of a notable work on the fungi of Bayern.

Schaefferia serrata Loes. Repert. Nov. Sp. 1: 162. 1905.

About 2 meters tall with spreading terete minutely pulverulent branchlets 1–2 mm. thick, elongate or short, the latter often leafless and bearing the fasciculately congested dioecious flowers; petioles about 1.5 mm. long; leaves spathulate-obovate, cuneate at base, obtuse or rounded at tip, denticulate-serrate, 6–11 mm. long, 3–7 mm. wide, obsoletely nerved; male flowers 4-merous on older wood in the axils of fallen leaves or sometimes in those of new leaves, about 3 mm. wide, pedicels slender, 3–5 mm. long; sepals free, rounded, scarcely 0.5 mm. long and wide; petals free, elliptic, about 3.5 mm. long (stamens much shorter), 1.75 mm. wide; disk obscure or none; pistil little rugose, bilobed at tip.—Differs from other species in the serrate leaves. F.M. Neg. 13331.

Cajamarca: Chepén to Cajamarca, Prov. Pacasmayo, 1,000 meters, *Weberbauer 4811*, type; 188.

AQUIFOLIACEAE. Holly Family

Reference: Loesener, Monogr. Aquifol., Nov. Act. Acad. Leop.-Carol. 78: 1–598. 1901; 89: 1–314. 1908.

Mostly evergreen, usually glabrous trees or shrubs with alternate simple estipulate leaves and axillary perfect or polygamous 4–9-merous flowers, sometimes solitary, often in cymes, racemes or

fascicles. Corolla imbricate in bud. Stamens as many as corolla parts or petals and alternate with them, usually affixed to base. Anthers 2-celled, oblong to subglobose, opening longitudinally. Disk usually lacking. Ovary (3)4–9-celled; style terminal or obsolete, the pendulous ovules 1 or 2 in each cell. Fruit a drupe, often berry-like, of (3)4–9 pyrenes, the seeds with abundant endosperm and small straight embryo.—Leaves opposite in one Philippine species.

ILEX L.

Paltoria R. & P. Prodr. 13. 1794. *Izquierdia* R. & P. l.c. 140. *pl. 30.*

Flowers often perfect, with persisting 4–5-parted calyx and rotate 4- rarely 5–6-parted corolla, the petals or lobes imbricate in bud, ovate to suborbicular or elliptic, rounded or very obtuse. Anthers ovoid or ellipsoid. Ovary 2–4–6(7–22)-celled. Drupes globose or ellipsoid with 3–4 (or rarely many) pyrenes.—Otherwise character of the family which it shares with only two other genera.

The monograph of Loesener will doubtless become a classic for its period; nevertheless modern research methods in systematic botany may result in considerable change in his taxonomy of the group. My compilation of course is directly from Loesener except the key, which has been devised primarily on the basis of convenience and is only suggestive, since it accounts for little possible variation.

In South America the genus is of particular interest as the source of the tea-like beverage "mate," which contains caffein, however, considerably less than tea or coffee (cf. Loesener, l.c. 2: 254). A principal source is *I. paraguayensis* St. Hilaire but a number of other species serve apparently as well, including the Peruvian *I. tarapotina* Loes.; cf. Sparn, Rep. Argent. Acad. Nac. Cienc. Miscel. no. 22. 1937, and Sprecher von Bernegg, Trop. Weltwirtschaftspflanzen 3. 1936.

Leaves emarginate, rounded or obtuse (rarely mucronate or barely acute), less than twice as long as wide (unless *I. microsticta* and *I. loretoica,* imperfectly known).

Leaves small, mostly or all 3 (4) cm. long or shorter.

Leaves epunctate beneath.

Leaves entire.

Midnerve villous, at least of mature leaves.

Leaves 4–7 mm. wide.....*I. ericoides.*
Leaves 15 mm. wide or wider.....*I. villosula.*
Midnerve of medium-sized leaves glabrous.....*I. quitensis.*
Leaves serrulate.....*I. caniensis, I. elliptica.*
Leaves punctate beneath, glabrous or puberulent.
Branchlets pulverulent; male flowers solitary.*I. Weberbaueri.*
Branchlets pilose-puberulent; male flowers 3.
Leaves 1–3 cm. long.
Nerves of mature leaves obsolete above.
I. Lechleri, I. ovalis.
Nerves of mature leaves rather prominent both sides.
I. Matthewsii.
Leaves 7 to rarely 11 mm. long.....*I. minutifolia.*
Leaves medium size, usually or mostly 4 cm. long or much longer.
Leaves pubescent beneath, at least midnerve, even at maturity, more or less ovate.
Leaves 5–9 cm. long, asperous above.....*I. trachyphylla.*
Leaves 3–5.2 cm. long, glabrous or pubescent above.
I. sessiliflora.
Leaves glabrous or essentially even beneath.
Leaves mostly or all notably narrower than 5.5 cm.; female calyx lobes acuminate.....*I. microsticta.*
Leaves mostly or all notably wider than 5.5 cm.; female calyx lobes rounded to acute.
Leaves (9) 11–18 cm. long.
Petioles 2–6 mm. long.....*I. loretoica.*
Petioles 10–25 mm. long.
Leaves subentire.....*I. anonoides.*
Leaves serrulate.....*I. teratopis.*
Leaves 5–10.5 cm. long.....*I. crassifolioides, I. crassifolia.*
Leaves obviously but sometimes shortly acute or acuminate.
Petioles 3–6 mm. long; leaves 3.5–6 cm. long, serrulate.
Leaves punctate beneath.....*I. cuzcoana, I. andicola.*
Leaves epunctate beneath.....*I. hippocrateoides.*
Petioles 8–17 mm. long; leaves mostly or all longer than 6 cm., entire or subentire.
Leaves 2–6 cm. wide, ovate-lanceolate or elliptic.

Leaves glabrous.
Leaves acutely subcaudate-acuminate.....*I. tarapotina.*
Leaves shortly and subobtusely acute or acuminate.
Leaves all about 1.5 dm. long.....*I. aggregata.*
Leaves mostly 5–10 cm. long, rarely some larger.
Leaves punctate beneath.....*I. andarensis.*
Leaves epunctate beneath.....*I. inundata.*
Leaves puberulent, especially beneath.....*I. Jelskii.*
Leaves 9–18 mm. wide, oblong-lanceolate.....*I. amygdalina.*

Ilex aggregata (R. & P.) Loes. Notizbl. Bot. Gart. Berlin 11: 95. 1931. *Izquierdia aggregata* R. & P. Syst. 278. 1798. *I. amygdalifolia* Rusby, Mem. Torrey Bot. Club 3, no. 3: 15. 1893; 128, fide Loesener.

Glabrous unless for the umbelliform solitary or usually fascicled often axillary inflorescences; branchlets lenticellate, about 3 mm. thick, the slenderer shoots densely striate; stipules 1 mm. long; petioles 5–10(17) mm. long, 1.5–2.5 mm. thick; leaves ovate-lanceolate or elliptic, rounded or obtuse at often slightly oblique base, acute or acuminate, 8–19 cm. long, 2.5– nearly 7 cm. wide, entire margin obscurely or not recurving, submembranous or thin-coriaceous, slightly lustrous above, paler beneath, the 10–17 lateral nerves very slender above, prominent beneath with the conspicuous reticulate venation; flowers 3–many, inflorescence 2–3-dichotomous, bracts scarcely 0.5 mm. long and wide, peduncles 9–25 mm. long, ultimate pedicels 3–5 mm. long; male flowers 4(5)-merous, calyx 1–1.25 mm. wide, lobes lacinulate-sinuate, 0.5 mm. long, acute; petals oval, about 2.2 mm. long, the subequal stamens with ovoid anthers; drupes globose, scarcely 5 mm. thick, stigma 4-lobed, pyrenes 4 or 5, smooth but very finely striate-rugulose.—A 4-meter shrub or a 10-meter tree (Weberbauer); determinations by Loesener.

Huánuco: Macora, *Ruiz & Pavón*, type. Pozuzo, *Weberbauer 6768; 6746; 6778.* Cueva Grande near Pozuzo, *4764.*—Junín: La Merced, *5537.* Bolivia.

Ilex amygdalina Reiss. ex Loes. Monogr. Aquifol. 1: 299. 1901.

Branchlets ascending, the older to 5 mm. thick, the puberulent shoots scarcely 1 mm. thick with minute subulate-deltoid stipules; petioles 9–11 mm. long, sulcate, 1.5 or at base nearly 2 mm. thick; leaves lanceolate, acute or cuneate-acute at base, more or less obtusely acuminate, 6– nearly 9 cm. long, 9–18 mm. wide, subentire

or remotely and obsoletely crenulate, the margin recurving, coriaceous, glabrous, slightly lustrous above, paler beneath; lateral nerves straight or little arcuate, marginally anastomosing, not or scarcely reticulate, obsolete above, rather prominent beneath; female inflorescence few-fascicled, puberulent-hirtellous, 1-flowered, the pedicel 3–4 mm. long; calyx under drupe about 3.5 mm. across, the subciliolate lobes rounded-obtuse; drupes globose, 4–5 mm. in diameter, pyrenes 4 or 5, dorsally striate.—Flowers according to author 4–5-merous, otherwise unknown. F.M. Neg. 19556.

Peru(?): Without locality, *Haenke*, type.

Ilex andarensis Loes. Monogr. Aquifol. 1: 394. 1901.

Strongly affine *I. tarapotina* according to the author but the fleshier leaves typically less acuminate, nerves less prominent beneath, inflorescences peduncled, calyx glabrous or nearly; young branchlets as flowers in type somewhat pubescent; petioles 7–11 mm. long or sometimes apparently shorter, sulcate-margined; leaves ovate to elliptic, entire margin narrowly recurved, obtuse or rounded at base, acute or obtusely acuminate (acumen sometimes 7–12 mm. long, in Peru short), 5–8 (13) cm. long, 2.5–5.5 cm. wide, coriaceous, glabrous, scarcely lustrous, minutely brown-punctate beneath, the 7–10 lateral nerves either obvious or obsolete above, slightly prominent beneath, sometimes reticulate; inflorescences typically pulverulent, peduncles 2–5, pedicels 1–4 mm. long; flowers 4(5)-merous, more or less hirtellous-puberulent, the calyx 1.5– barely 2 mm. wide, the corolla 2.5–3 mm. long; anthers ovoid; ovary 4–5-celled; stigma 4–5-lobed.—The forma *psila* Loes., l.c. 2: 289. 1908, has essentially or quite glabrous branchlets and inflorescences, globose drupes 4–4.5 mm. thick, estriate and esulcate, the 4 pyrenes obsoletely 1-striolate, hardly 3 mm. long. No material seen recently and the determination of the San Martín specimens may be open to question. Illustrated, Loes. l.c. *pl. 11, fig. 2.* F.M. Neg. 13194.

San Martín: Tarapoto, *Williams 5999.* Zepelacio, *Klug 3287; 3361.*—Loreto: Cerro de Escaler, *Ule 6353.* Canella Ucsha, *Ule 6718.* Cerro de Usco, *Ule.* Ecuador.

Ilex andicola Loes. Monogr. Aquifol. 1: 161. 1901 and 2: 277. 1908.

Similar to *I. crassifolia* and *I. crassifolioides;* leaves 6–7.5 cm. long, 2.5–3.5 cm. wide, rounded to acute, lateral nerves 8–10, impressed or plane and obsolete; inflorescence of male flowers with

peduncles 10–18 mm. long, ultimate pedicels 1–2 mm. long, calyx less than 2 mm. wide, glabrous except ciliolate obtusish lobes; petals to 2.3 mm. long; female flowers about 7, peduncles 8–20 mm. long, calyx 4–5-lobed, 1.5–2.25 mm. wide, the deltoid acute lobes callous-apiculate; ovary depressed, stigma 4-lobed, 4-celled, cells 1-ovuled; drupes globose, 4.5 mm. thick, immature.—Type from Huaycani by Pearce. The Cuzco material could be referred to *I. cuzcoana* if that is distinct. F.M. Neg. 13195.

Cuzco: Slender, 3–4 meters, rain-forest, Pillahuata, *Vargas 3016*. Cedrobamba, 22 meters, *Herrera 1564*.—Puno: Azalaya to Ichubamba, Prov. Sandía, 1,600 meters, *Weberbauer 1114* (det. Loesener); 278. Bolivia?

Ilex anonoides Loes. Monogr. Aquifol. 1: 164. 1901.

With many of the characters of the closely allied *I. crassifolia* and *I. crassifolioides* but the much larger leaves prominently reticulate, especially beneath where very densely punctate and with 13–19 lateral nerves; petioles 14–25 mm. long; leaves broadly elliptic to obovate, rounded both ends, 11.5–18 cm. long, 7.5–10.5 cm. wide, more or less remotely and broadly serrulate, opaque and granulate above, especially on the nerves; inflorescences glabrous, 4–7-flowered, compressed peduncles 6–17 mm. long, pedicels none or to 1 mm. long, the 4-merous flowers fasciculate apically; calyx to nearly 3 mm. wide, the subrotund lobes to 2 mm. wide; female corolla scarcely rotate, the firm ovate petals about 2 mm. long, the staminodia shorter, anthers broadly cordiform; ovary 4-celled; ovary globose, crowned with 4-lobed stigma, 5 mm. in diameter, with 4 smooth pyrenes.—Illustrated, Loes. *pl. 2*.

Puno: Tatanara, *Lechler 2624*, type.

Ilex caniensis Macbr. Field Mus. Bot. 8: 122. 1930.

Branches stout, short, the subangled branchlets, petioles (2–3 mm. long), and pedicels more or less densely hirtellous; leaves crowded, elliptic or elliptic-oblong, sometimes obovate, rounded or little narrowed at base, rounded-obtuse or mucronulately acute, 3–4.5 cm. long, 2–2.5 cm. wide, fleshy rigid-coriaceous, glabrous, lustrous above, opaque and epunctate beneath, margin scarcely revolute, serrulate to apex, the 5–6 lateral nerves little marked except beneath where prominent with the reticulate venation; peduncles 1–3-flowered, to 2 mm. long; pedicels 1–2 mm. long; flowers 5–6-merous, calyx 3 mm. wide, lobes rotund, obscurely ciliolate; petals

elliptic, 3–3.5 mm. long.—Compared with *I. uniflora* Benth. and *I. scopulorum* HBK. it differs from the former in pubescence and in the leaves, which are longer in proportion to width, and also from the latter, which is merely puberulent and has subrotund foliage. The type was from a shrub 1.5–2 meters tall.

Huánuco: Near Cani, *3455*, type.

Ilex crassifolia Hook. Icon. 2: *pl. 149*. 1837; 159.

Stout erect early sparsely pulverulent branchlets finally subterete and 2.5–4.5 mm. thick; stipules deltoid, acute, to 1.5 mm. long; petioles 8–11 mm. long, to 3.5 mm. wide, plane and striate above, sulcate and decurrent-margined beneath; leaves broadly elliptic to ovate-oblong, cuneate to obtuse or rounded at base, mostly rounded and minutely apiculate at tip, usually 5–7.5 cm. long, 3–4.5 cm. wide, adult glabrous, nearly opaque above, paler and punctate beneath, nigrescent-apiculate denticulate margin recurved; lateral nerves 9–11, obsolete or little prominent above, spreading, mostly straight, rather obvious beneath and often reticulate only at margin; inflorescences (including calyces) pulverulent, the male stoutly pedunculate (peduncles to 7 mm. long), the 3–7 subsessile flowers fasciculate, bracts ovate-lanceolate, the larger lower to 4 mm. long; flowers 4–5-merous, the calyx 4–4.5 mm. wide, the subequal ciliolate rounded lobes to 3.5 mm. wide; petals connate below, oval, 4– nearly 5 mm. long, 2–3 mm. wide, fleshy, papillose; anthers ovoid; pistil of male flowers ovoid, 1.75 mm. long, about 1.5 mm. wide.—Apparently a variant of *I. scopulorum* HBK., 171, of Ecuador, with even heavier leaves very narrowly recurved at margin if at all, the male inflorescences often many-flowered with pedicels finally 2–6 mm. long, female flowers solitary. The species name may be untenable but there perhaps are synonyms; a number of Andean shrubs of this group appear to be very similar indeed.

Amazonas: Chachapoyas, *Mathews*, type.

Ilex crassifolioides Loes. Monogr. Aquifol. 1: 160. 1901.

In general like *I. crassifolia* but the leaf nerves obviously reticulate beneath and the female inflorescence dichotomously forked, many-flowered, subumbelliform; stipules scarcely 0.5 mm. long; petioles more slender, 7–14 mm. long; leaves obovate to broadly oval, 7–10.5 cm. long, 3–6.5 cm. wide; calyx of female flowers 2.5 mm. wide; petals about 2 mm. long; ovary subovoid, crowned by

capitate stigma, mostly 4-celled.—Type a small tree 6 meters tall. F.M. Neg. 32565.

San Martín: Monte Campaña near Tarapoto, 1,700 meters, *Spruce 4461*, type.

Ilex cuzcoana Loes. Monogr. Aquifol. 2: 273. 1908.

Branchlets spreading or ascending, the older about 4 mm. thick, the much slenderer tips subvelvety puberulent; stipules subulate-filiform, scarcely 1 mm. long; petioles 3–6 mm. long, narrowly margined, only about 1 mm. thick; leaves ovate or oval to oblongish, obtuse to subcuneate at base, shortly but obviously acuminate, 3.5–5 (6) cm. long, 1.5–2.4 cm. wide, serrulate margin obscurely or not at all recurving, fleshy coriaceous, glabrous, lustrous above, opaque beneath where densely and minutely brown punctulate; lateral nerves 7–10 clearly impressed above, reticulate marginally, little marked or obsoletely beneath; inflorescence axillary or lateral, solitary, usually furcate, peduncles 5 mm. long, intermediary axes 3 mm. long, bracts barely 1 mm. long, unidenticulate, bractlets at base of the 1.5–2 mm. long pedicels; flowers 4-merous, calyx about 2 mm. wide, lobes deltoid, obtuse or rounded, ciliolate; petals ovate, 3 mm. long, 2 mm. wide, subauriculately dilated at base, stamens little shorter, the anthers ovoid-subcordiform; fruit and female flowers unknown.—Belongs to same group as *I. crassifolia* and rather near to *I. andicola* Loes., l.c. 1: 161, with slightly larger leaves, somewhat smaller flowers, probably not specifically distinct. Cf. also *I. boliviana* Britton, 154, the reticulation of the leaves typically more prominent beneath. F.M. Neg. 13206.

Cuzco: Intihuantani to Torontoi, Prov. Convención, 2,100 meters, *Weberbauer 5067*, type; 245.

Ilex elliptica HBK. Nov. Gen. & Sp. 7: 70. 1824; 182.

Branchlets hirtellous, the older tardily glabrate; petioles 1–2 mm. long; leaves elliptic or suboval, rounded both ends, 2–3.5 cm. long, 11–21 mm. wide, finely serrulate margin narrowly recurving, pulverulent and epunctate beneath, fleshy coriaceous, glabrous or nearly above, the 5–6 lateral nerves there obsolete, rather prominent beneath, not reticulate; male flowers unknown; female solitary in the axils or on stems, 5–6-merous, pedicels 4 mm. long, medial bractlets about 0.5 mm. long, hirtellous as the calyx, this 3.5– scarcely 5 mm. wide, the acutish lobes to 1.5 mm. long; petals oval, 4.5–5 mm. long; ovary 5-celled, cells 1-ovuled; drupes subglobose, about 8 mm.

in diameter, esulcate and estriate, pyrenes 4, obsoletely trigonous.—Probably to be joined to *I. Kunthiana* Triana of Colombia with smaller mostly 4-merous flowers (Loesener), calyx lobes obtuse, petals about 2.5 mm. long. Maybe the Stork and Horton specimen should go to *I. caniensis* Macbr., if that is distinct.

Cajamarca: Contumasa, *Bonpland*, type.—Huancavelica: Near Surcubamba, 3,000 meters, *Stork & Horton 10380* (det. Standley, *I. caniensis?*).

Ilex ericoides Loes. Monogr. Aquifol. 1: 176. 1901.

Resembles *I. Lechleri* and thus *I. ovalis* but leaves epunctate beneath, strongly revolute, minutely serrulate, nerves impressed above; villous pubescence of young branchlets subglandular; stipules persisting, about 1 mm. long; petioles 1–2, rarely 2.5 mm. long; leaves oval, doubtfully ovate, cuneate-rounded or cuneate-acute at base, obtuse and mostly apiculate, 5–13 mm. long, 4–7 mm. wide, even adult villosulous on midnerve beneath; petals of female flowers oval, 2 mm. long; drupes broadly ellipsoid, 4.5 mm. long, 4 mm. thick, persisting stigma obsoletely 4-lobed, pyrenes 4, finely striate but esulcate.—F.M. Neg. 13210.

Puno: Sachapata, *Lechler 2591*, type.

Ilex hippocrateoides HBK. Nov. Gen. & Sp. 7: 72. 1824; 155.

Glabrous tree, the new branchlets at most 2 mm. thick; petioles about 6 mm. long, finally sulcate above; leaves broadly oblong to oblong-lanceolate, acute both ends or obtusely acuminate at tip, 4–6 cm. long, 1.5–2.3 cm. wide, plane or nearly to the serrulate margin, coriaceous, sublustrous above, the 8–10 larger lateral nerves densely reticulate, the reticulation particularly conspicuous beneath in the smaller; female flowers and fruit unknown or at least not recognized; male inflorescences solitary at base of new wood or in leaf axils, 3–7-flowered, glabrous, the peduncles 7–13 mm. long, pedicels at tip 1.5–2.5 mm. long, bracts acute, the larger about 0.5 mm. long; flowers 4-merous, calyx 2–2.5 mm. wide, the subsemiorbicular acute or acuminate ciliolate lobes sometimes five; otherwise unknown.—F.M. Neg. 13217.

Peru?: Type from Peru according to Loesener but no locality given by HBK.

Ilex inundata Poeppig ex Reiss. in Mart. Fl. Bras. 11, pt. 1: 43. *pl. 11, fig. 5.* 1861; 403.

Glabrous, the striate branchlets sparsely and minutely lenticellate, finally 3–5 mm. thick; petioles 6–12 mm. long, sulcate, little margined by the decurrent leaf-base, this acute or obtuse; leaves about oval or rarely subobovate, entire, mostly obtusely acuminate (acumen to 12 mm. long), rarely obtuse, 7–15 cm. long, 3–6.5 cm. wide, coriaceous or subchartaceous, not punctate; lateral nerves 7–10, straight or mostly arcuate toward the margin, laxly reticulate, moderately prominent only beneath; inflorescences about 5–10-fasciculate, the male often dichotomous, peduncles and pedicels short (1 mm. long), the female 1-flowered, peduncles and pedicels 5–7 mm. long; flowers 4-merous, female calyx 2–2.25 mm. wide, lobes ciliolate, petals to 3 mm. long, 1–2 mm. wide; anthers cordate, subsagittate; stigma capitate, scarcely lobed; ovary 4-celled.—F.M. Neg. 13219.

Loreto: Near Iquitos, *Ducke 1915*. Florida, *Klug 2314*. Mishuyacu, *Klug 426; 427; 456*. Amazonian Brazil.

Ilex Jelskii Zahlbr. in Szyszyl. Diagn. Pl. Nov. 1: 9. 1894; Dissert. Classis Math. Phys. Acad. Litt. Cracov. 29: 223. 1895; 413.

Branchlets straight, 4 mm. thick, apically pubescent; stipules subulate, about 0.5 mm. long; petioles 8–13 mm. long, tip nearly 2 mm. thick; leaves oval or elliptic to ovate-elliptic, cuneate-obtuse to subrounded at base, shortly and acutely acuminate or acute, 5.5–8 cm. long, 2–3.5 cm. wide, recurving margin entire, rigid-coriaceous, densely puberulent, especially beneath, notably lustrous above; lateral nerves 9–10, little prominent, very slender, anastomosing obsoletely near margin; male flowers unknown, the female 4–5-merous, 5–10 in leaf axils, peduncles 6–10 mm. long, pedicels 2–4 mm. long; calyx 2–2.5 mm. broad, pubescent lobes deltoid; petals oval, slightly pilose without, to 2.5 mm. long; ovary 4–5-celled, the cells 1-ovuled; drupes ovoid, gray sericeous, pyrenes 4.—F.M. Neg. 13220.

Cajamarca: Tambillo, *Jelski 37*, type.

Ilex Lechleri Loes. Monogr. Aquifol. 1: 177. 1901.

Similar to *I. ovalis* but the new branchlets villosulous-hirtellous, the older to 4 mm. thick; stipules nearly 1 mm. long; petioles more slender; leaves oval, or ovate or oblong-oval, crenulate-serration less prominent, mostly 1.5(–2) cm. long, 6–11, mostly 9 mm. wide, peduncles and pedicels slenderer, more pilose or villous, flowers smaller.—In view of the other similar plants described as distinct

species these differences can scarcely be valid; however, female flowers unknown. F.M. Neg. 23192.

Puno: Sachapata, *Lechler 2607*, type.

Ilex loretoica Loes. Repert. Nov. Sp. 1: 166. 1905; Monogr. Aquifol. 2: 288. 1908.

Glabrous, the young shoots 2–3 mm. thick, the year's 3.5–6 mm. and the older branchlets to 9 mm. thick, early lenticellate and finally sulcate; stipules soon absent; internodes 5–35 mm. long; petioles 2–6 mm. long, stout; leaves elliptic to obovate or oval, apparently obtuse both ends or rounded at tip (mostly imperfect in type), 12–18.5 cm. long, 5–9 cm. wide, finally rigid-coriaceous, paler beneath where minutely brownish puncticulate, the 9–12 lateral nerves beneath rather prominent as the reticulation, this obsolete above; inflorescences many in axils or often some extra-axillary, the male mostly 3-flowered, the slender peduncles 9–16 mm. long; bracts broadly deltoid, 3-dentate, about 0.25 mm. long, bractlets at base of the 1–2 mm. long pedicels; flowers 4-merous, calyx explanate, 2.5–3 mm. in diameter, lobes hardly 2 mm. long and barely to 2 mm. wide at base, obscurely repand-denticulate; corolla subrotate with ellipsoid sublinguliform petals, connate or subfree, about 3.5 mm. long, the stamens nearly as long; pistil depressed, lobulate; female flowers and fruit unknown.—Next to *I. nervosa* Triana of Colombia, which differs especially in indument (Loesener). It also closely resembles *I. laurina* HBK., 360, country unknown, probably Ecuador, Colombia or Venezuela (Loesener) but that species has rather lanceolate acuminate leaves 4–5.5 cm. wide.

San Martín: East of Moyobamba, 1,500 meters, *Weberbauer 4749*, type; 267.

Ilex Matthewsii Loes. Monogr. Aquifol. 1: 176. 1901.

Erect, densely leafy branchlets pulverulent-hirtellous to 3.5 mm. thick; stipules subulate-filiform to nearly 1 mm. long; petioles 3–5 mm. long, decurrently margined to 1.75 mm. thick; leaves broadly oval to subobovate, obtuse or sub-rounded at base, rounded and minutely black apiculate at tip, 1.5 to 3 cm. long, 8–16 mm. wide, the narrowly recurved margin densely serrulate, fleshy-coriaceous, glabrous except sparsely pilosulous on midnerve beneath and above at margin, especially the younger, paler beneath and densely brown punctulate; lateral nerves 4–7, marginally anastomosing and reticulate, rather prominent on both sides; inflorescence solitary in leaf

axils or rarely at base of new shoots, pulverulent-hirtellous, the male 3–7-flowered, peduncles 5–10 mm. long, pedicels 1–2 mm. long, the basal bracts and bractlets subulate-deltoid; male flowers 4-merous, the calyx 2.5–3 mm. wide, the broadly deltoid rounded or obtuse ciliolate lobes scarcely 1 mm. long; petals suborbicular, about 2.5 mm. long and wide; anthers broadly ellipsoid; otherwise unknown.—Near *I. ovalis* with viscid branchlets, shorter slender pedicels and more slender lateral nerves obsolete above in the adult leaves. F.M. Neg. 23193.

Amazonas: Chachapoyas, *Matthews*, type.

Ilex microsticta Loes. Repert. Nov. Sp. 1: 164. 1905.

Glabrous, unless the bracts, the soon densely lenticellate branchlets to 6 mm. thick, the leaf internodes 1–2 cm. long; petioles 8–13 mm. long, subplane above, striate- and subplicate-angulate beneath; leaves obovate to elliptic, rarely subovate, cuneate at entire base, serrulate to rounded tip, (5) 7–10.5 (13) cm. long, (2.4) 3.6–5.5 cm. wide, rigid-coriaceous, densely and minutely punctate beneath, the 7–10 lateral nerves and reticulation there rather prominent, the latter obsolete above; female inflorescences solitary in the axils or often at base of lateral shoots before the leaves, mostly about 4-dichotomous and on peduncles 1–2 cm. long, these applanate and bicarinate, the spreading somewhat carinate bracts about 1.5 mm. long, ciliolate or sparsely pilose; pedicels 2–3 mm. long; flowers 4-merous; calyx quadrangular-subcupuliform, 2.5–3 mm. wide, tube subequaling the acuminate lobes, these about 1 mm. long; male flowers unknown; female rotate, petals little oblique, about 3.25 mm. long, stamens much shorter; ovary 4-celled with fleshy capitate 4-sulcate stigma.—Would be given number 62a in monograph; suggests *I. teratopis* Loes. but has smaller flowers and mostly smaller leaves, especially, 1-ovuled cells; *I. crassifolia* Hook. pulverulent inflorescence, sepals acutish (author). F.M. Neg. 13229.

Huánuco: Monzón, 2,000 meters, *Weberbauer 3532*, type; 255.

Ilex minutifolia Macbr., nom. nov. *I. microphylla* Hook. Icon. Pl. 2: *pl. 139*. 1837; 174, not Spreng. ex DC., 1825.

Low much-branched shrub, with many mostly spreading straight branchlets, the striately angled younger densely puberulent, finally glabrate, subterete, to 4 mm. thick; stipules subulate, scarcely 0.5 mm. long; petioles 0.75–1.5 mm. long; leaves suborbicular-

ovate or oval, obtuse, rounded or rarely acute, often minutely apiculate, 7–11 mm. long, 5–7 mm. wide, coriaceous and ridged, the margin nearly plane, slightly lustrous, scarcely paler beneath where minutely puberulent on the midnerve and black punctate; lateral nerves 4–5, inconspicuous above, often less beneath, anastomosing at the margin; inflorescence solitary in leaf axils, the male 3- the female 1-flowered, minutely hirtellous; bracts 3-dentate, linear, at base of 3-flowered pedicel, at middle of 1-flowered pedicel; male peduncles about 3 mm. long, pedicels scarcely 3 mm. long, the female to 3 or in fruit to 4 mm. long; flowers 4-merous; calyx to 2 mm. wide, puberulent, the obtuse or acute triangular lobes ciliate; corolla about 2.5 mm. long and broad or in the female flower narrower; anthers broadly ellipsoid; ovary 4-celled, the cells 1-ovuled; drupes subglobose, the 4-lobed stigma prominent, about 4.5 mm. thick, the 4 pyrenes scarcely 3 mm. long, dorsally convex, striate-sulcate.—F.M. Neg. 23194.

Ayacucho: Guancas, (*Fielding 1636*).—Amazonas: Chachapoyas, *Matthews 1636*, type?

Ilex ovalis (R. & P.) Loes. in Engl. & Prantl, Pflanzenfam. Nachtr. 1: 219. 1897; 179. *Paltoria ovalis* R. & P. Fl. Peruv. 1: 54. 1798. *I. Paltoria* Pers. Syn. 1: 152. 1805.

Much-branched shrub, the many straight erect branchlets to 6 mm. thick, subviscid, the shoots also pilose-puberulent; stipules subulate, about 0.5 mm. long, petioles 2–2.5 (3) mm. long, decurrently margined, to scarcely 1 mm. thick; leaves oval, suborbicular or rarely ovate, obtuse or acute at base, rounded and obscurely black apiculate at apex, 1–2.6 cm. long, 7–16 mm. wide, rigid-coriaceous, lustrous above, paler and black punctulate beneath, the plane or nearly plane margin crenulate-serrulate; midnerve prominent beneath, the 3–6 lateral slender and anastomosing at margin, obsolete above, more or less conspicuous beneath; inflorescence solitary in leaf axils, hirtellous or nearly glabrous, the male 3-flowered, peduncles 3–4 mm. long, pedicels scarcely 1 mm. long, bracts ovate-acuminate, 1-2-dentate, about 0.5 mm. long, the smaller bractlets at base acuminate, in female in middle of pedicels; flowers 4-merous or calyx sometimes 5-lobed, in female flower 2–2.5 mm. broad, the lobes subrotund; corolla (female) about 2.5 mm. long to 3 mm. broad; stigma obsoletely 4-lobed, the ovary 4-celled, the cells 1-ovuled.—The male flowers are undeveloped in type and the female, according to the monographer, may not belong to the species. Probably should be interpreted to include as variants the several similar plants.

Junín: Churupallana and Siusa, *Ruiz & Pavón*, type. Chanchamayo, *Isern 2300*.—Huánuco: Chacahuassi and Huacahuassi, *Ruiz & Pavón*. "Quinti," "quinoi."

Ilex quitensis (Willd.) Loes. Monogr. Aquifol. 1: 221. 1901. *Rhamnus quitensis* Willd. ex Roem. & Schult. Syst. 5: 295. 1819. *I. bumelioides* HBK. Nov. Gen. & Sp. 7: 71. 1824.

Branchlets ascending, early striate sulcate, the gray-barked older 2.5–3.5 mm. thick, the usually pulverulent densely leafy shoots about 1.5 mm. thick; stipules subulate; petioles 4–6 mm. long, margined; leaves erect, obovate to elliptic or oval-oblong, entire or some closely serrulate, acute or cuneate at base, rounded or subobtuse, minutely mucronulate, mostly 2.5 (1.6–4) cm. long, 8–14 mm. wide, coriaceous, lustrous above; midnerve slender above, prominent beneath as the 4–5 (8) lateral nerves (these obsolete above) nearly straight, marginally minutely reticulate; inflorescences fasciculate in the leaf axils or the female rarely solitary on new branchlets, all glabrous or pulverulent, the male dichotomously 3-flowered or rarely 4–5-flowered, peduncles 1–4 mm. long, bracts minute, deltoid, pedicels 1–2 mm. long, basally bibracteolate; female inflorescences 1-flowered, pedicels 3–7 mm. long; flowers mostly 4-merous; calyx 2 or in female flower and under drupe to 3 mm. wide, the obtuse lobes to 1 mm. wide at base, to 0.75 mm. long; male corolla rotate, the oval petals 2.5 mm. long, in the female ovate and free or nearly; stamens about one-fifth shorter than male petals, or the almost free or free staminodia one-sixth shorter; ovary obtuse, conical, the stout stigma obsoletely 4-lobed; drupes obtusely angled, about 5 mm. long, 3.5 mm. broad, with 4–5 dorsally sulcate pyrenes.—Description of flowers after Loesener, Repert. Nov. Sp. 1: 166. 1905. Forma *glabra* Loes. l.c. has glabrous shoots. F.M. Neg. 13241.

Amazonas: Molinopampa to Chachapoyas, 2,000 meters, *Weberbauer 4329; 4356;* 263. Ecuador, Guiana.

Ilex sessiliflora Triana, Ann. Sci. Nat. sér. 5. 16: 378. 1872; 166.

Distinctly pilose, especially the branchlet tips, inflorescences, these solitary, and the leaves beneath; older branchlets to 4 mm. thick, sulcate, glabrescent; stipules subulate-filiform, about 1 mm. long, persisting; petioles 4–7 mm. long, narrowly margined, dilated at base; leaves ovate or ovate-elliptic, obtuse at base, rounded or

obtuse, rarely acute at tip, nigrescent-apiculate, 3–5.2 cm. long, 13–29 mm. wide, the densely serrulate margin often revolute or recurved, rigid-coriaceous, lustrous or opaque above where sparsely villous, at least on impressed midnerve and nerves, these 5–7(–9), prominent particularly beneath as the reticulate veins; inflorescences simple or dichotomous, 3–7-flowered or the female usually 1–3-flowered, peduncles 6–23 mm. long, bracts deltoid, acute or acuminate, pedicels 1.5–2.5 mm. long or the female flowers subsessile; flowers 4-merous, calyx more or less villous, the male about 1.5 mm. wide with obtuse or acute ovate-deltoid lobes scarcely 1 mm. long, the female 3–4.5 mm. wide, with rounded ciliolate lobes 1.5 mm. long; corolla subrotate, petals elliptic to obovate, male to 2.5 mm. long, female 3.5–5 mm. long; ovary truncate-subellipsoid, 4-celled; drupes (immature) 6 mm. long, 5 mm. thick, with 4 pyrenes.—The var. *Pearcei* Loes., l.c. 168, has leaves sparsely villous or glabrate, petals of female flowers about 3.5 mm. long, calyx lobes acute or acuminate. F.M. Neg. 13248.

San Martín: Road to Vitoc, *Ruiz & Pavón*.—Puno: Sachapata, *Lechler 2588; 2589*. Bolivia; Colombia.

Ilex tarapotina Loes. Monogr. Aquifol. 1: 393. 1901.

Glabrous unless the minutely pulverulent young branchlets and the male inflorescences, these mostly fasciculate in the leaf axils; stipules subulate, about 1.25 mm. long; petioles 8–12 mm. long, angled and rugulose beneath, 1–1.75 mm. thick; leaves ovate-oblong to sublanceolate, cuneate to obtuse at base, gradually acuminate, 8.5–10.5 (13) cm. long, 2.5–3.5 (5) cm. wide, entire margin recurved, fleshy-coriaceous, very lustrous above, paler and minutely punctulate beneath; lateral nerves 8–10, anastomosing only at margin, obsolete above as sometimes beneath; flowers 3–7 (male), 4–5-merous, peduncles 5–11 mm. long, pedicels 1–2 mm. long, bracts less than 1 mm. long; calyx to nearly 2 mm. wide, glabrous or nearly in type, the subulate deltoid lobes scarcely ciliolate; petals hardly 3 mm. long; anthers ovoid or ellipsoid.—Here would be sought *I. laurina* HBK., 360, origin unknown but probably from north of Peru (Loesener), the leaves minutely serrulate, inflorescences glabrous. Illustrated, Loes. l.c. *pl. 10, fig. 1*. F.M. Neg. 32570.

The leaves furnish a very good tea or "mate," according to Ule.

San Martín: Tarapoto, *Spruce 4399*, type.—Junín: Eneñas, Pichis Trail, *Killip & Smith 25685*.

Ilex teratopis Loes. Monogr. Aquifol. 1: 93. 1901.

Glabrous except for the puberulent many-flowered (male) axillary panicles of 4-merous fragrant flowers; branchlets stout, even the annual 4.5–6 mm. thick; stipules persisting, deltoid, acute, to 2 mm. long; petioles margined, plicate-sulcate, 10–16 mm. long, 2–3.5 mm. thick; leaves obovate or broadly oval, subcuneate or rounded at base, rounded at tip, about 9–15.5 cm. long, 5.5–8 cm. wide, fleshy and rigid-coriaceous, margin serrulate, recurving, slightly lustrous above, paler and densely punctate beneath, the midnerve bistriate above, multi-striate and sulcate beneath, there the 12–15 lateral nerves prominent and reticulate, little so above; female flowers 6 or 7, the drupes fasciculate-congested at tip of 1.5–2.5 cm. long peduncle, this to 4 cm. long in the male panicles, their calyces 3–5 mm. wide with deltoid obtuse lobes 1.25–1.75 mm. long; petals to nearly 5 mm. long, the shorter stamens with ellipsoid anthers; drupes globose or depressed rugulose with prominent evidently 4-lobed stigma, mostly 7–8 mm. thick, with 4 biovulate pyrenes.—Type of the subgenus *Yrbonia*, unique by its biovuled ovary cells and its many-flowered long-peduncled panicles of male flowers. Type a 3–7-meter tree from Huaycani by Pearce. Illustrated, Loes. l.c. *pl. 1, fig. 2.*

Huánuco: Río Pozuzo, *Weberbauer 6780* (det. Dahlem). Pan de Azucar, *Sawada 62.*—Puno: Between Sandía and Chunchusmayo, Cachicachi, 2,000 meters, *Weberbauer 1313* (det. Loesener); 242. Bolivia?

Ilex trachyphylla Loes. Monogr. Aquifol. 2: 277. 1908.

Branchlets, these 4–5 mm. thick, axillary solitary inflorescences and leaves shortly scabrous hirtellous, the latter especially asperous above and hirtellous beneath on the nerves; petioles 2–4 (6) mm. long, about 3 mm. wide, sulcate above, angled and hirtellous beneath; leaves ovate, oval or obovate, rounded both ends or sometimes excised, 5.5–9 cm. long, 3.3–6.5 cm. wide, obscurely and remotely if at all serrulate, rigid-coriaceous, lustrous above, less so and indistinctly brunnescent-punctate beneath, the 7–9 lateral nerves and reticulate venation there prominent; peduncle (female flowers) 2–3 cm. long in fruit, subdivaricate secondary axis 2–3 mm. long, bracts to 5 mm. long, pedicels 1–1.5 mm. long, the 5–6-merous flowers apically congested; calyx 5–6 mm. wide, nearly as broad as the depressed globose drupe, this with 5–6 pyrenes that are obsoletely few-striate dorsally.

Cajamarca: Shanyn, *Jelski 1176*, type.

Ilex villosula Loes. Monogr. Aquifol. 1: 366. 1901 and 2: 288. 1908.

Branchlets and leaves beneath villous, the former to 4 mm. thick, the minute stipules hidden in the pubescence; petioles 3–4 mm. long; leaves usually elliptic to obovate, commonly cuneate-acute at base, rounded and often emarginate, 3–4.5 cm. long, 1.5–2.2 cm. wide, entire margin revolute, fleshy and rigid-coriaceous, sparsely short-hirtellous above; lateral nerves 4–7, impressed above, prominent beneath, reticulate both sides; inflorescence (female flower) usually single at base of shoots, sometimes fasciculate in leaf axils (male not seen), 1-flowered, hirtellous, pedicels 4–5 mm. long; flowers 4–5-merous, calyx about 1.25 mm. wide, lobes acute, petals less than 2 mm. long; ovary 4–5-celled, the stigma 4–5-lobed; male flowers 4-merous, 1–5, ordinarily fasciculate in leaf axils, hirtellous, peduncles 2–5 mm. long, pedicels about 1 mm. long or, when only one flower, to 4 mm. long, bractlets subulate at base of pedicels, calyx lobes broader than long, shortly acuminate, barely 0.5 mm. long, petals nearly free, oval or ovate, 1.5– nearly 2 mm. long, about 1 mm. wide, the stamens, their anthers ovoid, about as long.—Sometimes a tree to 8 meters tall (Weberbauer). F.M. Negs. 13265; 23198.

Amazonas(?): Yambrasbamba, *Mathews 1565*, type.—Libertad: Valley of the Mixiollo, 2,200 meters, *Weberbauer 7043*.—Huánuco: Monzón, Prov. Huamalies, 1,700 meters, *Weberbauer 3560*.—Puno: Cachicachi, 1,900 meters, Prov. Sandía, *Weberbauer 1155* (det. Loesener).

Ilex Weberbaueri Loes. Repert. Nov. Sp. 1: 165. 1905.

Densely branched, 1 meter tall, the somewhat angled pulverulent young shoots to 1 mm. thick, the older subterete with sordid gray sulcate bark and at third year 3.5 mm. thick; leaf internodes to 7 mm. long; petioles 1.5–3 mm. long, barely 1 mm. broad; stipules minute, subulate; leaves ovate-oblong to obovate-oblong, rarely ovate-oval, or obovate, mostly cuneate at base, rounded or obtuse at apex and then often apiculate, sometimes subacute, 7–14(–17) mm. long, 3–9 mm. wide, rigid-coriaceous, glabrous, 2–4-crenulate-serrulate, obviously punctate and 3–4-nerved beneath or the nerves obsolete, there as above the reticulation inconspicuous; male inflorescences 1-flowered, solitary in leaf axils, glabrous or essentially, pedicels 3–4 mm. long, medially bibracteolate; flowers 4-merous, calyx patelliform, 2–3 mm. in diameter, erect lobes longer than tube, acuminate,

subsetulose or punctiform pubescent, 1.3 mm. long, 1 mm. wide at base; corolla subrotate, petals broadly obovate, 3 mm. long, 2 mm. wide; pistil (male flower) subcylindric, the beak 4-sulcate.—A meter tall. Near *I. ovalis* (R. & P.) Loes. with pilose branchlets, 3-flowered male inflorescences; other relatives different and Brazilian. F.M. Neg. 13261.

Junín: Near Huacapistana, 3,000 meters, *Weberbauer 2091*, type; 251.

CYRILLACEAE. Cyrilla Family

Erect shrubs or small trees with alternate estipulate entire leaves crowded toward the tips of the terete branches and actinomorphic flowers in axillary or terminal simple or panicled racemes. Calyx valvate and 5-parted or with 5 equal or very unequal persistent sepals. Petals 5, more or less cohering at base, imbricate or contorted. Stamens 5 or 10, inserted on receptacle, the free filaments subulate, the 2-celled anthers finally longitudinally dehiscent. Disk annulate, cylindric or subcupulate, confluent with base of 2–4(5)-celled ovary. Style developed or obsolete, stigma punctiform or acutely lobed. Ovule solitary on inner angle or pendulous, then several. Fruit capsular or drupaceous, sometimes winged, more or less subtended by calyx; seeds 1–4 with endosperm, the straight cylindric embryo small.

PURDIAEA Planchon

Reference: Fr. Mattick, Notizbl. Bot. Gart. Berlin 12: 395–397. 1935.

Costaea Richard, 1853. *Alloiosepalum* Gilg, Notizbl. Bot. Gart. Berlin 11: 97–99. 1931.

Leaves sessile. Racemes few-flowered. Sepals unequal, often conspicuously. Petals ovate to obovate. Stamens 10, apiculate. Ovary globose.—The single Peruvian species conforms closely to the family character but it is striking by its strongly unequal veiny sepals; Gilg placed it, with query, in the Ochnaceae, a not unreasonable error discovered by Mildbraed.

Purdiaea Weberbaueri (Gilg) Mattick, Notizbl. Bot. Gart. Berlin 12: 395, 398. 1935. *Alloiosepalum Weberbaueri* Gilg, Notizbl. Bot. Gart. Berlin 11: 97. 1931.

Glabrous shrub, the bark of the younger branches grayish-black; leaves obovate-oblong to oval, gradually narrowed to base, acute or

shortly apiculate, 3–4 cm. long, 1–1.5 cm. wide, coriaceous, opaque both sides, the slender reticulation prominent only beneath; racemes 3–4 cm. long; bracts linear, 1 mm. wide, 5–7 mm. long; outer sepals broadly ovate, rounded apically, obviously nervose, about 1 cm. long, 7–8 mm. wide, the lanceolate acute inner 6–7 mm. long, 2 mm. wide, marginally ciliolate; petals reddish-lilac, 7–8 mm. long, 4–5 mm. wide, ovate or broadly ovate, apiculate; filaments about 3 mm. long; anthers 4 mm. long; ovary 2 mm. in diameter; style 5 mm. long; stigma punctiform.—Type was a 2-meter shrub. According to Mattick, who gives a key to the known species, the Peruvian shrub is distinguishable by a combination of leaf-size, completely glabrous racemes and subequal sepals and petals, but apparently the author himself had decided that it was referable to *P. nutans* Planchon of Colombia, probably a too conservative interpretation unless future collections show intergradation. Illustrated, Gilg, l.c. 98, *fig. 3*.

The data for this compilation were kindly supplied by "Roxy" Ferris and Barbara Law of the Dudley Herbarium to whose staff, it may be recorded, I am so often indebted.

Amazonas: In woods, Molinopampa between Chachapoyas and Moyobamba, 2,100 meters, *Weberbauer 4774*, type; also *4332*.

This number of the Flora of Peru was in proof before I saw a copy of Pflanzenfamilien ed. 2. 20b, which pertains to several of the families treated. Some of my judgments might have been altered and some probable errors and omissions avoided if this excellent source book had been available during the preparation of my account. However, I have been able in a few instances to insert data from it, thanks to the prompt loan by Marjorie W. Stone, Bibliographer of the Gray Herbarium, of their copy, which was sent directly to Stanford at the kind suggestion of Professor G. F. Ferris, then in charge of the Natural History Museum there.

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